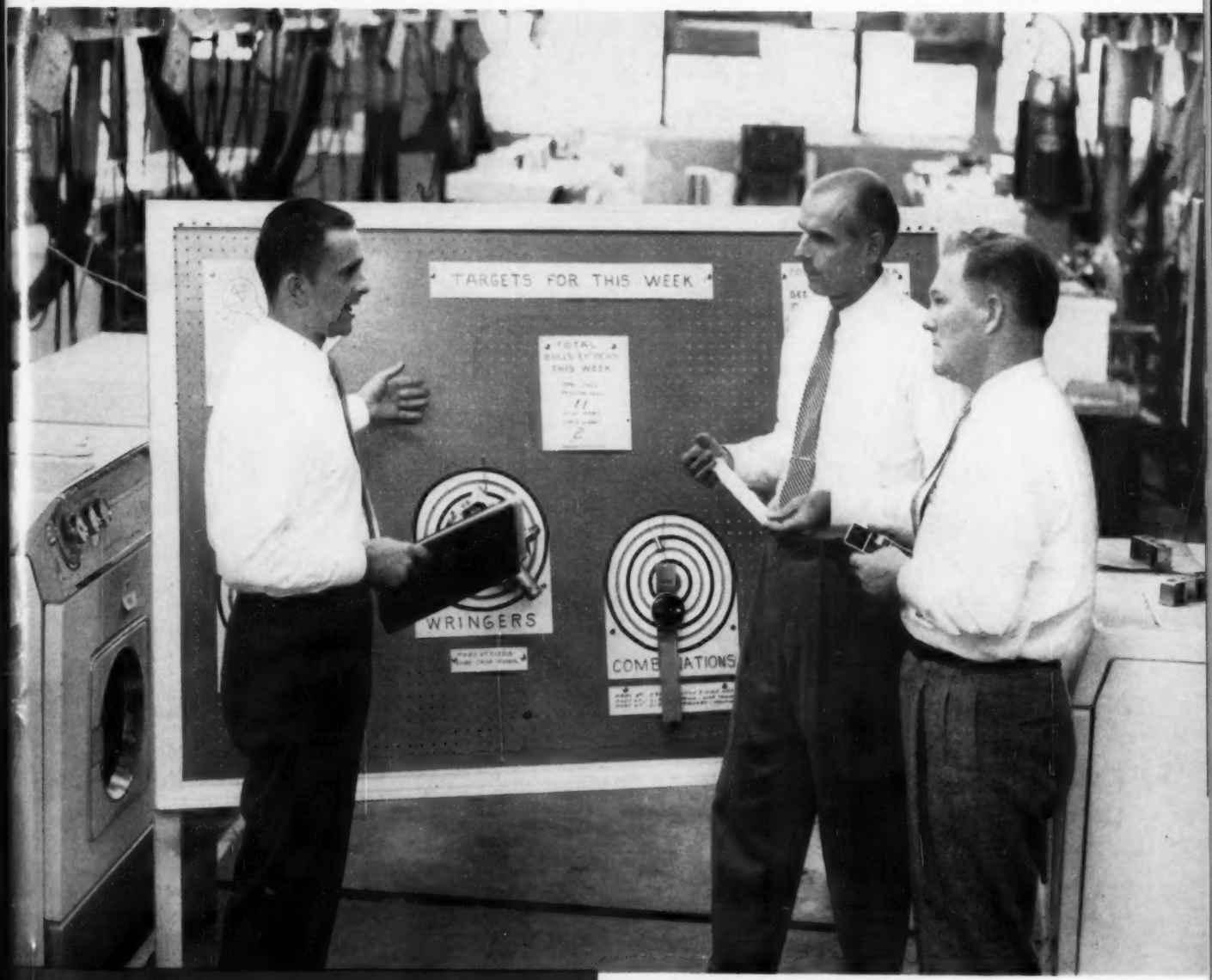
The IRON AGE

November 19, 1959 A Chilton Publication The National Metalworking Weekly



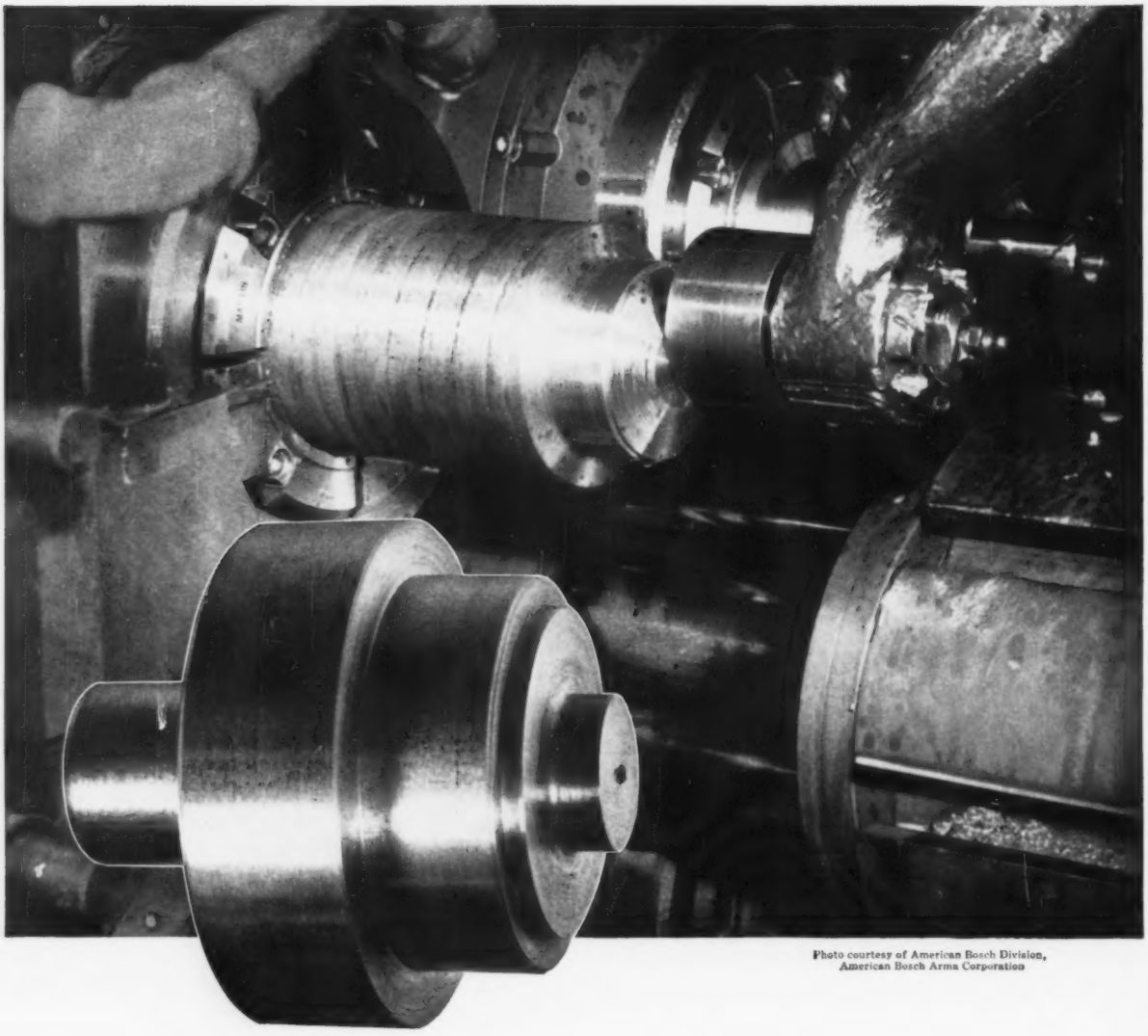
Whirlpool's Tellander, Upton and Heisler—

Value Analysis: How It Helps Sell Your Products P. 117

How Steelmakers Got a Flying Start – P. 77

Fabricators Push For Lower Costs – P. 80

Digest of the Week – P. 2-3



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The IRON AGE

November 19, 1959—Vol. 184, No. 21

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*Starred items digested at right.

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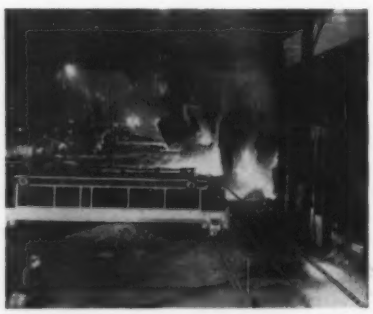
FAST MILL STARTUP

Supply Flow Helped — Large-scale push to get ore, coke, scrap and other materials into mills



helped get steelmaking operations off to a fast start. P. 77

STEEL LABOR

Injunction Politics—Union and management are stepping up negotiations in secret talks. Meanwhile, union strategy is to settle with aluminum, copper, and canmakers to bring added pressure. P. 79

STRUCTURALS

New Move—Structurals fabricators are turning to automation to cut costs. There isn't enough work to go around, and the competition is keen. P. 80

FASTENER INDEX

Barometer—After being publicity shy for years the Fastener Institute announces it will publish a

Metalworking

COVER FEATURE

VALUE ANALYSIS: At Whirlpool Corp., St. Joseph Div., they know that the consumer is the chief inspector of the company's products. Lynn Tellander, D. F. Upton, and D. L. Heisler know how to plan accordingly. P. 117

regular index of shipments which it expects will be a sensitive business barometer. P. 82

STRIKE LEGISLATION

Ready for 1960—Anti-business Senators and Congressmen are readying proposals to avoid future long strikes. Mandatory arbitration is one idea that will be advanced. P. 99

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HYDRAULIC SPRAY

Insures Scale-Free Steel — The presence of scale on steel surfaces during hot forming operations causes more problems than meet the eye. But high-pressure jets of cool water create a shrinkage that loosens the scale from the steel surface. P. 120

IMPROVED TUBING

Through Ultrasonics—The petrochemical industry has preferred seamless tubing for use in its heat exchangers. But the pendulum is beginning to swing toward welded steel tubing. Ultrasonics joins the in-process inspection team that produces quality tubing in one giant step. P. 122

MORE METALS RESEARCH

Missile-Makers Demand It—National security depends upon missile development. As a result, there's probably more research in this field than any other. Metals research groups are meeting this challenge with new alloys and better fabrication methods. P. 124

THE IDEAL INGOT

One Step Closer—Careful control of variables in the steelmaking process has given one specialty steel company consistent quality throughout the ingot. The system controls four variables in the steelmaking process. P. 128

GASEOUS COMPOUND

Chromizes Bolts and Tubing—Chromizing parts embedded in powder can be slow and costly. A faster way to prevent corrosion from forming on surface parts is to subject the same surfaces to chrome-halogen compounds. P. 130

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AUTO OUTPUT

Doesn't Look Good—Automakers are cheering the 80-days of steel they'll get. But they won't get enough to build inventories. P. 95

FARWEST EXPANSION

Eastern and Midwest Arrivals—Companies from the East and Midwest are adding to the growth along the West Coast. Some buy up local firms. Others start new plants. P. 101

FOREIGN TOOLS

Hard Sell—Foreign toolmakers are setting their sights on U. S. markets. New lines are being well received by American industry. P. 103

STEEL SUMMARY

New Moves — Secret talks by union and industry negotiators did clear the air somewhat. But both sides are still far apart. 2-B clause may be arbitrated, but under language more acceptable to union than in first proposal. P. 167.

INDUSTRIAL TRUCKS

Holding Steady—Industrial truckmakers generally have enough steel on hand to continue production. They expect no price increase unless steel costs climb. P. 168

NEXT WEEK

EARNINGS

Hold Them Steady — Uneven earnings patterns are common to industrial equipment makers. Next week, E. L. Miller, Copper-Bessemer Corp's president outlines a program for stabilizing company earnings.

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CARL S. HARVEY, *Technical Director, Lamson & Sessions, tells why...*

You overspend when you overspecify... on fasteners

Overspecifying can be costly in ordering fasteners . . . especially in view of the trend toward higher "physicals" and correspondingly higher component costs.

Here's a typical example: A customer specified AISI 1137 steel (a screw machine grade) for a nut. After a look at the "physicals" we recommended a cold forged nut of AISI 1030 steel (a straight carbon steel) and met all requirements at considerably lower cost to the customer.

In many instances we're recommending ordinary grades of carbon steel over the customer's specs of low alloy content material. Our improved heat treatment practices make the savings possible. Elementary cases, perhaps, but they happen every day!

Take Advantage of the specialized experience and facilities available to you through L&S. Leave reference to "chemistry" open. Tell us what you want in end results. Give us the "physicals" and tolerances—then stop! This helps us save *you* money, in both purchasing costs and assembly costs.

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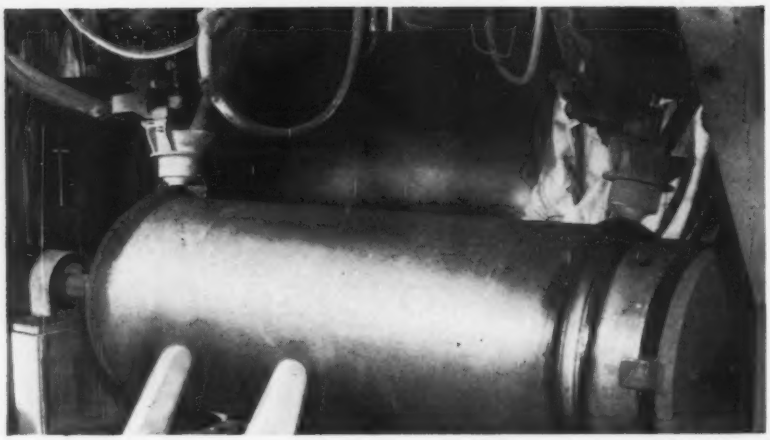

New steels are born at Armco

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No. 2	64,000 (typical)	45,000 (typical)	Equivalent to No. 1	Holds paint—welds as well as No. 1, but is more workable.
No. 3	60,000 (typical)	40,000 (typical)	Equivalent to mild steels	Designed for drawing—Surface suitable for plating with proper preparation.
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A Catalyst Needed In Management-Labor Crisis

Each side in the steel labor crisis accuses the other of being emotionally entrenched in its position. Each thinks that its side is 100 percent correct.

It isn't true that only one side is emotional about basic issues. There is no labor leader or industrialist in the world who is free of emotion in discussing what he feels to be "right."

The steel industry has a sound position in its inflationary argument. It is sound as the dollar used to be in admitting that the end has come for more steel price increases.

Also, the steel industry is right to attempt to root out wasteful practices in archaic local practices conditions.

The union is wrong in attempting to get a package which will be inflationary. It is wrong in trying to take over the distribution of profits. That is the province of management—and management alone.

The union is wrong, too, in refusing to cooperate in attempting to cut down or eliminate costly work practices that don't make economic sense.

Now that we have placed the blame in a logical and factual way, what happens? Do we run the nation into the ground? Do we hold out until the President reluctantly steps in?

There may be no settlement soon. Steel people are expecting workers to vote on the last offer at the end of 60 days of the Taft-Hartley injunction. They see no great hope of settlement.

The union is preparing to fight that vote and to convince the men the companies are trying to take away their rights. It says another strike is imminent at the end of 80 days.

Steelmakers can't do much now to convince the workers that they will be honest, thorough, and fair in their work rule changes—if they get the chance to make the changes. Of course, the steelmakers will be fair and honest. But if the men think they won't, no power on earth will make them believe otherwise.

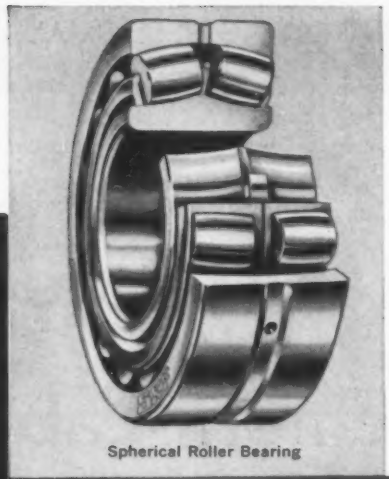
Is this the time for both sides individually and quickly to consult (privately) someone else on their side? He may have a different slant from that of the principals!

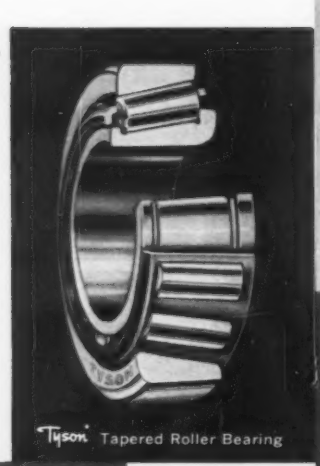
Is this the time to quickly and seriously think about a catalyst to head off what now looks like the worst industrial relations fight in all of our commercial history?

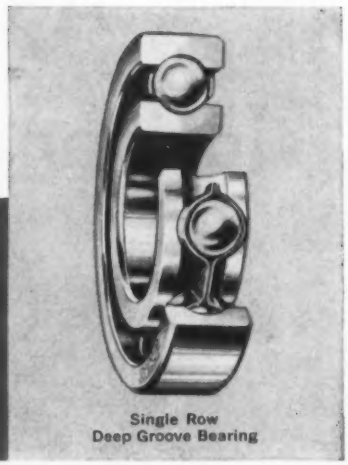
More and more people on union and management sides are saying so privately!

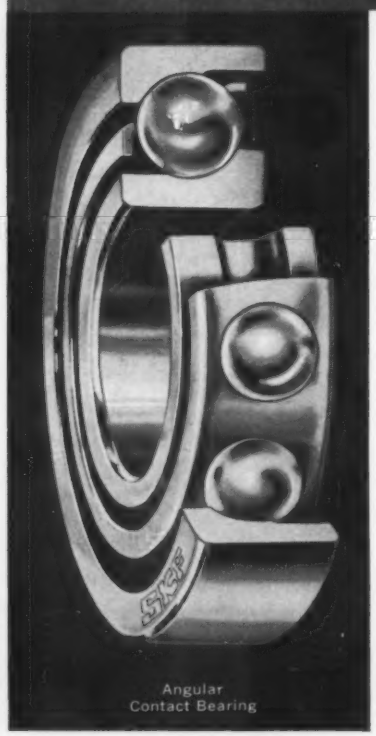
Tom Campbell

Editor-in-Chief









When can a standard bearing do a "special" job?

Suppose you need a high speed bearing to support either heavy thrust load or thrust load combined with radial load. It is almost a certainty that SKF angular contact ball bearings will do the job.

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How To Make Diamonds

Key to the making of diamonds out of carbon is the use of a molten metal catalyst which acts as a thin film between the carbon and the growing diamond crystal. According to the report just released by General Electric, a number of metals can do the job. In the process, carbon and the catalyst metal are subjected to pressures ranging from 800,000-1,800,000 psi and temperatures ranging from 2200°-4400°F.

Openhearth Roofs Hold Up

New basic roofs for openhearths seem to have come through the steel startup intact. There were some patching jobs but no major failures, according to a refractory man. It is too soon to say that none of the 160 all-basic furnaces will fail but apparently the new design has passed a severe test.

Cuts Plating Time

Simplified process for silver-plating aluminum takes only three steps after routine degreasing. These are: an alkaline dip; a new type of mercuric compound bath; silver plating itself. In addition to cutting plating time, reports Allis-Chalmers, the new process uses less silver.

Improves Machinability

Research reveals that selenium, on a weight basis, is more effective than sulfur in improving the machinability of hot-work die steels. In lab tests, the presence of 0.05 pct selenium improved the machinability ratings of annealed samples by 8 pct. On bars, heat-treated to 330 Bhn, the improvement exceeded 50 pct.

Preventive Maintenance

Look out for a rash of production troubles when metalworking plants resume operations, experts warn. Plant managements today lack experience in dealing with long shutdowns, they explain, especially with transfer lines and other automatic processes. Without preventive maintenance, accumulated dirt, dust, lack of lubrication will cause expensive downtime, and damage to hardened machine ways.

Chemical Prevents Scale

New protective coating will permit faster and cheaper heat-treatment of metals, claims North American Aviation, Inc. It is a chemical which prevents scale formation. Applied by spraying or dipping, the chemical adheres to the metal at furnace temperatures forming an oxygen-tight seal. As the metal cools, the coating spalls off.

Natural Gas Raises Output

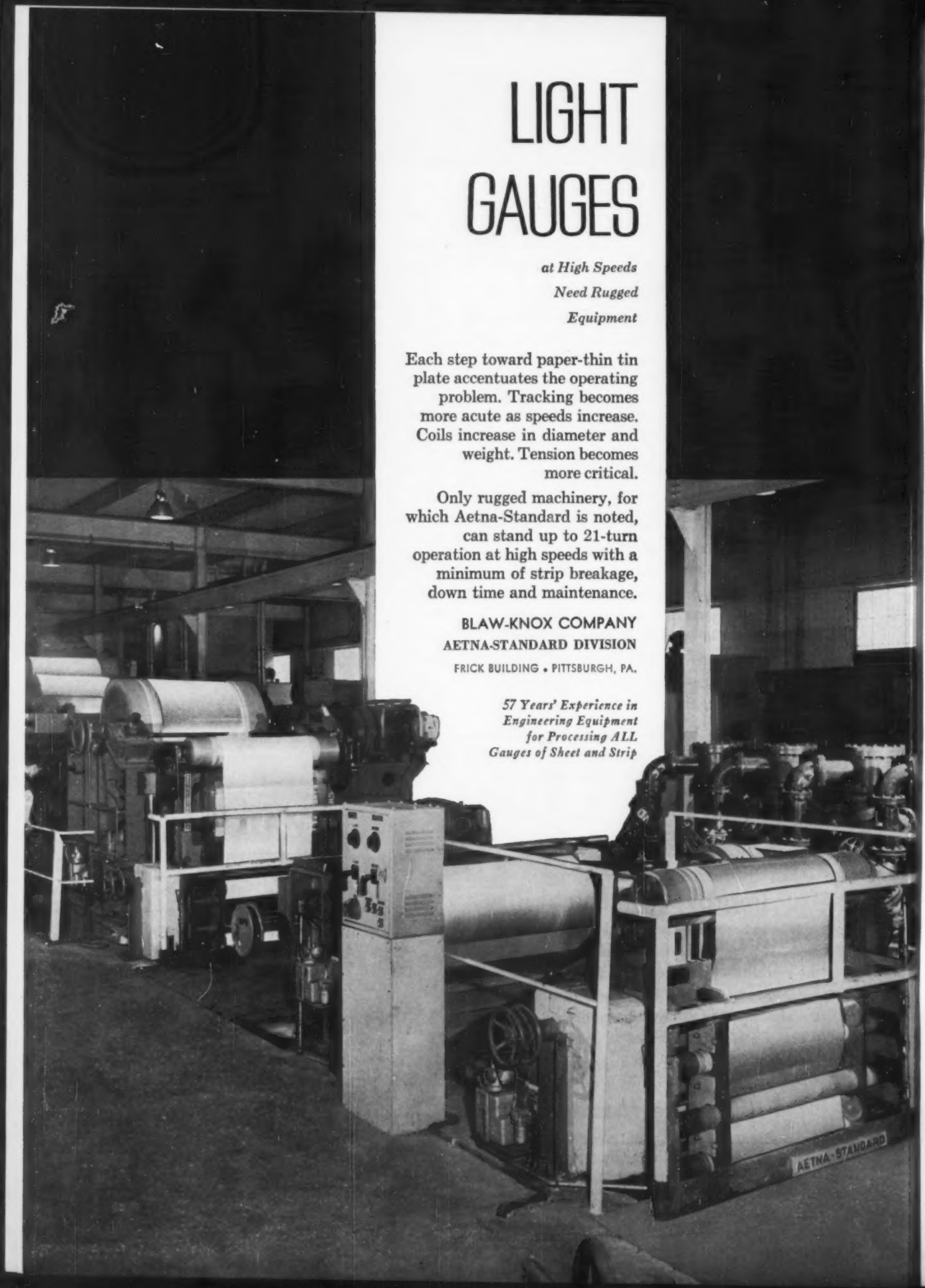
Steel mills are already moving on recent Bureau of Mines studies on enrichment of blast furnace air with natural gas. A 5 pct natural gas addition to the blast can reduce coke consumption 30 pct, up iron output 25 pct. Studies were confirmed by Jones & Laughlin in an independent check.

Melt Reactive Metals

Water-cooled copper crucible for induction melting — without contamination — of reactive metals is technically feasible, report scientists at Battelle Memorial Institute. At present, titanium and other reactive metals are melted in consumable electrode furnaces to prevent melt contamination. Advantages of cold-crucible induction melting include: no specially prepared electrode; vigorous stirring action.

Flat-Polish Steel

Current steel conditions are focusing attention on the flat-polishing technique as a way to get around steel shortage problems. This is a machining process that uses coated-abrasive belts to perform a combined metal removing and surface polishing operation. Where adaptable, it's possible to resize or polish the steel for less than a penny a pound.



LIGHT GAUGES

at High Speeds
Need Rugged
Equipment

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Shades of Rome

Sir—I hope your excellent November 5 editorial (Second Class Nations: When Will We Become One?) will wake up some of the bleeding hearts who bleat, as you put it, that "inflation is far worse than the danger of Soviet domination."

Shades of Rome! Here we are, with the barbarians at the gates, spending millions on dubious mercenaries to protect us while we grow fatter and fatter. Inflation is bad, certainly, but slavery is intolerable! — J. E. Evon, Asst. Purchasing Agent, Shwayder Brothers, Inc., Detroit.

Coated Metals

Sir—We would appreciate having a reprint of the article "How to Get More for Your Metalworking Dollar — Coated Metals" in your October 22 issue.

We tried coated metals a number of years ago and were discouraged from their use in the manufacture of desk lamps. But now we feel that they may again be practical in view of the many advances made as shown by the article in your magazine. — C. W. Helbig, Purchasing Agent, Industrial Lamp Corp., Elkhart, Ind.

Behind the Smile

Sir — Upon reading the poem "Why Nikita Smiles" (page 11, Nov. 5 issue) I could only think that the person who wrote it must be from the "old school." Today it is very unlikely to find anybody getting "something for nothing."

This last quoted comment has been heard by thousands of school children from schoolteachers for years. Also, the comment, "discourage those with strength and drive," is as far from the truth as anything I've heard in years.

Believe you me, Nikita isn't smiling because of the reasons stated by Mr. Reeves. He's smiling because he's broken into our market, the first step in weakening our economy from within.—Disgruntled Reader.

Heat Treating

Sir—In your Newsfront page in the Oct. 8 issue there is an item about a novel heat treating process. There is mention that an AISI 4340 steel was heat-treated to a tensile strength of 334,000 psi with an 11 pct elongation.

We would appreciate any additional information you may be able to provide on this heat treating process.—J. A. Rassenfoss, Mgr., Mfg. Research Lab., American Steel Foundries, East Chicago, Ind.

▪ **For more data contact Richard G. Taylor, Research Development Corp. of America, Gardena, Calif. —Ed.**

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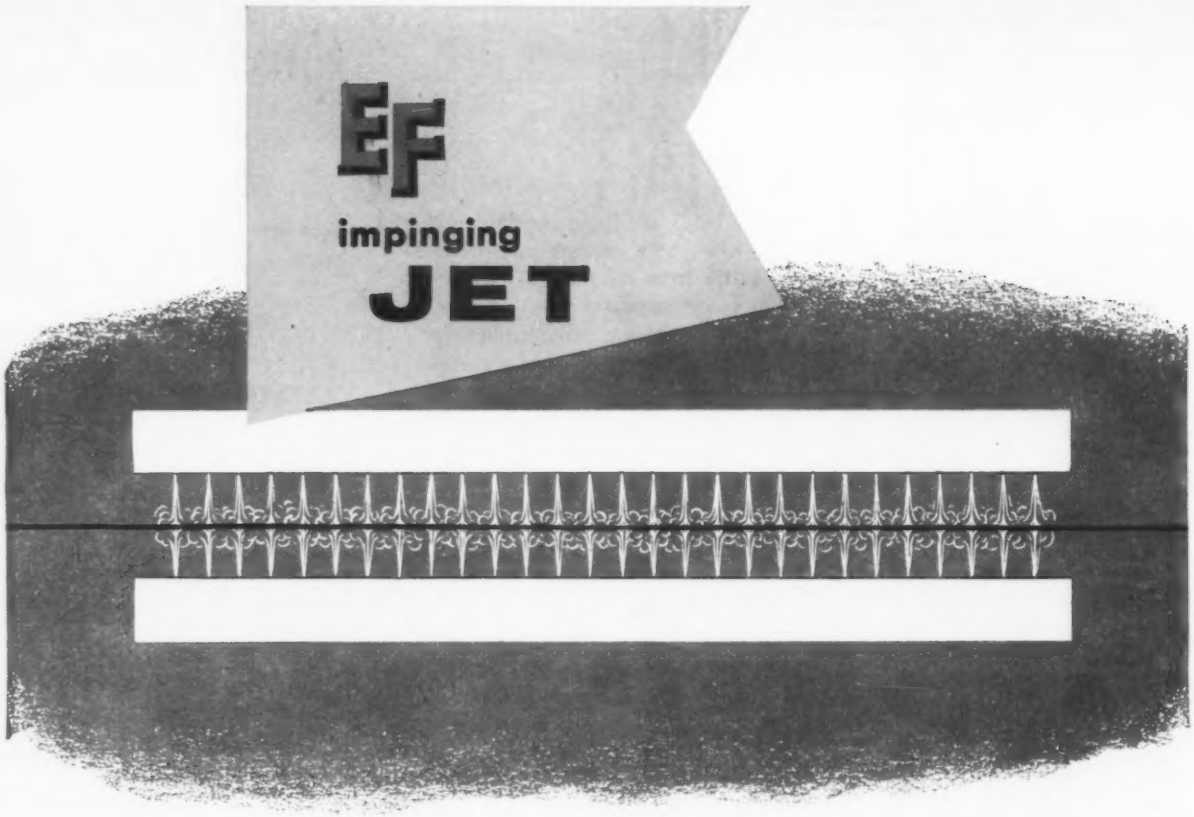

speeds heating and cooling of any ferrous or non-ferrous strip . . .

OR OTHER FORMS OF MATERIAL

Conceived and developed by our engineers, EF Jets feature a unique design that substantially increases the rate of heat transfer. Units already in service — or under construction — have capacity to process more than 60,000 tons per month.

EF Jets can eliminate up to 80% of the length required by conventional static cooling arrangements; and can be used with any special protective atmosphere. Similar savings can be made in the length of heating sections. The systems are suited to heating and cooling many other forms of material, in addition to strip.

An EF Jet system installed on the 132 foot long continuous strip line in our research department is available for your use in making test and experimental runs.

For up to the minute engineering — and performance — on any ferrous or non-ferrous heat treating project, consult EF's experienced — and progressive — furnace engineers. You'll find it pays!

EF

THE ELECTRIC FURNACE CO.

Gas-fired, Oil-fired and Electric Furnaces for Heat Treating any Product, Using any Process, any Hourly Output.

400 West Wilson Street *Salem - Ohio*

Branch Offices in Detroit, Mich., Santa Ana, Calif., and Cheshire, Conn. Canadian Associates, Canefco Limited, Toronto 13, Ontario

Crystal Ball

What sort of a year will you have in 1960? True, the steel strike has clouded industry's crystal balls—but the need to plan ahead is still there. So we, and industry, are still doing it.

This is the time when the editors team up with the research brains to query top executives in the various industries that make up metalworking. The results will appear in your Jan. 7 Annual Issue.

Foreign Competition!—With returns in from enough precincts to do a better job than was done on Harry Truman versus Tom Dewey, we can make one flat statement: Foreign competition is going to raise more hackles this year than ever before.

The problem is not limited to foreign steel, either. We have some caustic comments from executives in copper and brass, in nuts and bolts—and of course, from some machine tool builders. Forecast: It could replace labor as the No. 1 headache of the soaring sixties. Or are the two really one?

Market Review

Want some reading for those long winter evenings coming up? If you do, we suggest a new, 1200-page book on the European Steel Community. A guide to the structure of the common market, it includes up-to-date information on the union and its member companies.

Special sections include data on iron and steel mills, mines, mining equipment makers, and other suppliers. The book lists plant locations as well as company names.

Please note it's written in French, German, and Italian, with products listed in English. The book sells for $18. Publisher is Business Publications, 120 Riverside Drive, New York 24, N. Y.

Official title is "The Undertakings of the European Coal Steel Community and Its Suppliers, 2nd Enlarged Edition."

Dog's Life

Metals have done it again—helping solve another of those vexing little problems of life. This time it's the question of letting your dog, cat, or pet mongoose in and out at strategic moments.

The answer is a device made of aluminum and plastic and called the "Flexport." It can be installed on doors, porches, windows, or mounted on outside walls.

Triangular-shaped shutters close automatically after the pet enters. They keep out rain, snow, wind, and insects. Even puppies and kittens can get through the opening with ease, says manufacturer—Turen, Inc., Danvers, Mass.

Sizes are available to fit all pets from cats and Pekingese right up to Great Danes and St. Bernards.

But, we can't help wondering, how about the neighbor's cat or dog, or even a curious skunk?

"There's one specification you'll have to meet for this job . . . you must be a six-footer."

NEED TUBULAR RIVETS IN A HURRY ?

NEW ENGLAND DIVISION
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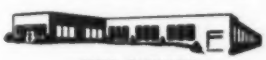

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5 MILFORD MANUFACTURING PLANTS are within overnight trucking distance of your assembly line.

To give you unmatched service on tubular rivets, Milford has five manufacturing plants and twenty sales offices strategically located across the country's industrial beltline.

For the answers to delivery problems . . . *get in touch with Milford first!*

THE MILFORD RIVET & MACHINE CO.

MILFORD, CONNECTICUT • HATBORO, PENNA.
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Photo (taken before installation) shows plate leveler now operating at Inland Steel's Indiana Harbor Works.

INLAND STEEL
levels plate with this
VOSS LEVELER...
up to 2000 tons per shift...
speeds to 282 FPM

And it really comes out flat! Talk about versatility: This leveler is designed for hot-rolled plate up to 74" wide, and has a guaranteed thickness range of 3/16" to 5/8". BUT... *Inland Steel is successfully flattening as low as 1/16" floor plate with it.* This particular installation is on a long plate processing line, where shearing is done after leveling. Therefore, the Voss Leveler has been handling plate *up to 40 feet in length.*

Voss Levelers will solve almost any leveling problem ... *at high production speeds.* Patented features make possible accuracy and flatness unheard of with any other leveler, *equalling or exceeding stretcher-level flatness* in many cases. Voss Levelers are now in use in steel, aluminum and other non-ferrous plants, in applications ranging from heavy plate to cold-rolled strip, galvanizing lines, aluminum sheets and many others. Let Voss put its years of experience to work for you. Call or Write today.

Voss ENGINEERING CO.

7301 Penn Ave., Pittsburgh 8, Pa. Churchill 2-4422

COMING EXHIBITS

Plant Maintenance & Engineering Show — Jan. 25-28, Convention Hall, Philadelphia. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Tool Show—April 21-28, Detroit Artillery Armory, Detroit. (American Society of Tool Engineers, 10700 Puritan, Detroit 38.)

Welding Show—April 25-29, Great Western Exhibit Center, Los Angeles, (American Welding Society, Inc., 33 West 39th St., New York 18.)

Southwestern Metal Show — May 9-13, State Fair Park, Automobile Bldg., Dallas, Texas. (American Society for Metals, Metals Park, Novelty, O.)

Design Enginering Show—May 23-26, Coliseum, New York. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Production Engineering Show — Sept. 6-16, Navy Pier, Chicago. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Machine Tool Show—Sept. 6-16, International Amphitheatre, Chicago. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

MEETINGS

NOVEMBER

National Machine Tool Builders' Assn.—Annual meeting, Nov. 19-21, The Greenbrier, White Sulphur Springs, Va. Association headquarters, 2139 Wisconsin Ave., Washington, D. C.

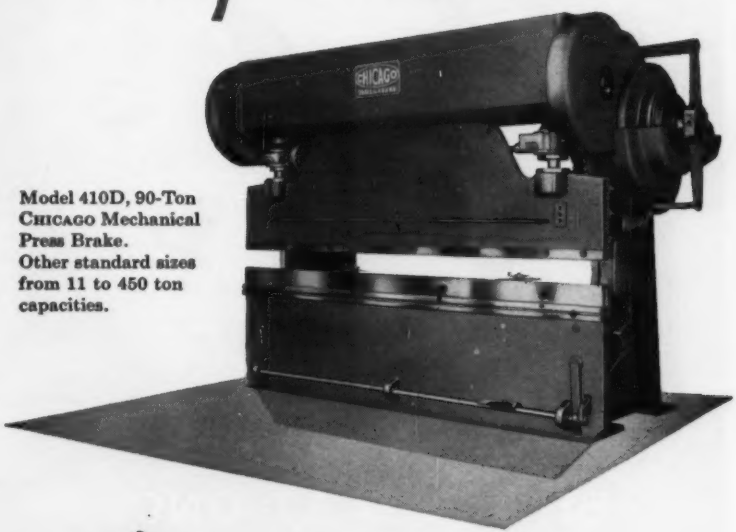
American Management Assn.—Research and development conference, Nov. 23-25, Ambassador Hotel, Los Angeles. Association headquarters, 1515 Broadway, New York 36, N. Y.

The American Society of Mechanical Engineers — Annual meeting, Nov. 29-Dec. 4, Chalfonte Haddon

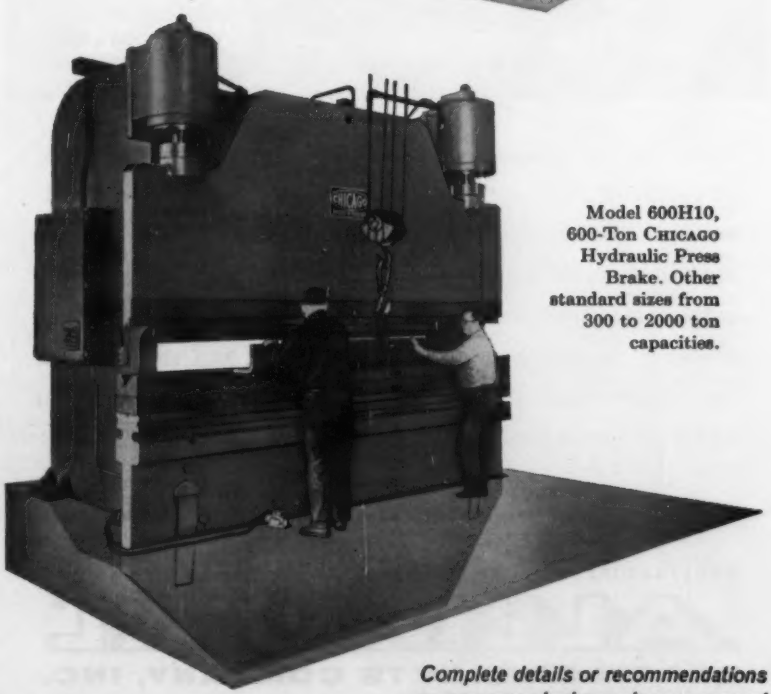
(Continued on P. 16)

CHICAGO® PRESS BRAKES

unexcelled accuracy / ***for sheet metal and plate work***



Model 410D, 90-Ton CHICAGO Mechanical Press Brake. Other standard sizes from 11 to 450 ton capacities.



Model 600H10, 600-Ton CHICAGO Hydraulic Press Brake. Other standard sizes from 300 to 2000 ton capacities.

Complete details or recommendations on any press brake work upon request

8439

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Press Brake Dies
Straight-Side-Type Presses
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West Coast Division—Warehouse & Office
5822 West Washington Boulevard, Culver City, California
Phone: WEbster 3-9595
TWX: LA 1472

MEETINGS

(Continued from P. 15)

Hall, Atlantic City, N. J. Society headquarters, 29 W. 39th St., New York.

American Institute of Steel Construction, Inc. — Annual convention, Nov. 30-Dec. 3, The Boca Raton Hotel & Club, Boca Raton, Fla. Institute headquarters, 101 Park Ave., New York.

DECEMBER

Electric Overhead Crane Institute—Annual meeting, Dec. 2, Carlton House, Pittsburgh. Institute headquarters, One Thomas Circle, Washington 5, D. C.

Electric Furnace Steel Committee—17th Annual conference, Dec. 2-4, Hotel Cleveland, Cleveland. Committee headquarters, 29 W. 39th St., New York.

Electronic Industries Assn.—Quarterly meeting, Dec. 2-4, Statler Hilton, Los Angeles, Calif. Association headquarters, 1721 DeSales St., N. W., Washington, D. C.

National Assn. of Manufacturers—Annual meeting, Dec 2-4, Waldorf-Astoria, New York Association headquarters, 2 East 48th St., New York.

National Warm Air Heating & Air Conditioning Assn.—Meeting, Dec. 2-4, Chase Park Plaza Hotels, St. Louis, Mo. Association headquarters, 640 Engineers Bldg., Cleveland.

Material Handling Institute, Inc.—Annual meeting, Dec. 13-16, Savoy-Hilton Hotel, New York. Information: Hanson & Shea Inc., One Gateway Center, Pittsburgh 22, Pa.

JANUARY

Society of Plastics Engineers, Inc.—Annual technical conference, Jan. 12-15, Conrad Hilton Hotel, Chicago. Society headquarters, 65 Prospect St., Stamford, Conn.

style is stainless steel

Stainless Steel is the only surfacing material with a hard lustrous finish that is always in style, withstands exposure to all kinds of wear and has a low maintenance cost for the life of the building.

No other metal offers the freedom of design and fabrication, economy of care and the durable beauty that serves and sells like Stainless Steel.

McLOUTH STEEL CORPORATION, Detroit 17, Michigan

specify

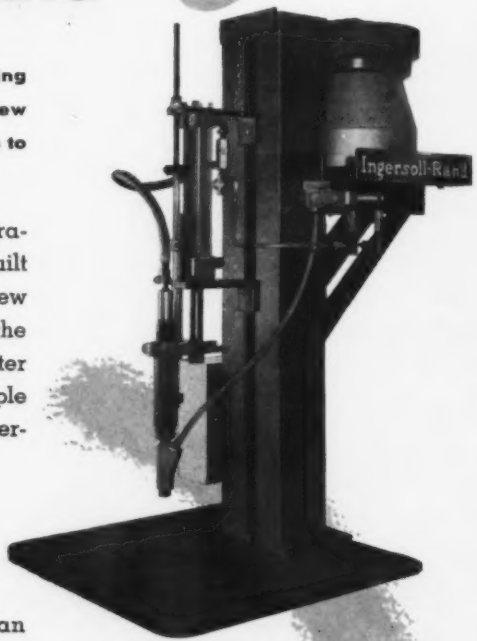
McLOUTH STAINLESS STEEL

HIGH QUALITY SHEET AND STRIP

for architecture

for complete flexibility in rapid automatic fastening

the NEW *r.a.f.* screw driver by Ingersoll-Rand



You get complete flexibility by moving, adding or removing powerheads—by varying screw types or sizes—or by adjusting power ranges to meet different torque requirements.

Now you can automate your fastening operations without buying expensive, custom-built fastening equipment. With the versatile, new R.A.F. Screw Driver, you can run one job in the morning, and a completely different job after lunch. Changing the screw pattern is as simple as loosening and then tightening two powerhead bolts.

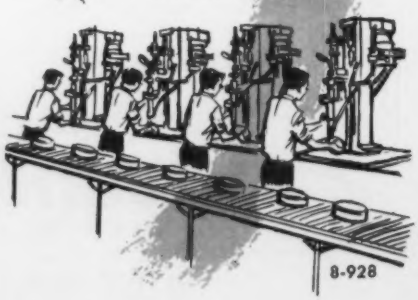
dividends on payroll dollars

Using the new R.A.F. Screw Driver, one man can outperform a half dozen operators using conventional hand held screw drivers. As an example of savings possible with Rapid Automatic Fastening, multiply the yearly wage you pay one operator by the number of operators the R.A.F. Screw Driver replaces. This figure, minus the cost of the R.A.F. Screw Driver, represents your Dividend on Payroll Dollars for the first year alone.

For the full story on Dividend Dollars with Rapid Automatic Fastening, call your local Ingersoll-Rand office today, or write for Bulletin 5266.

✶ in small shops

✶ on assembly lines



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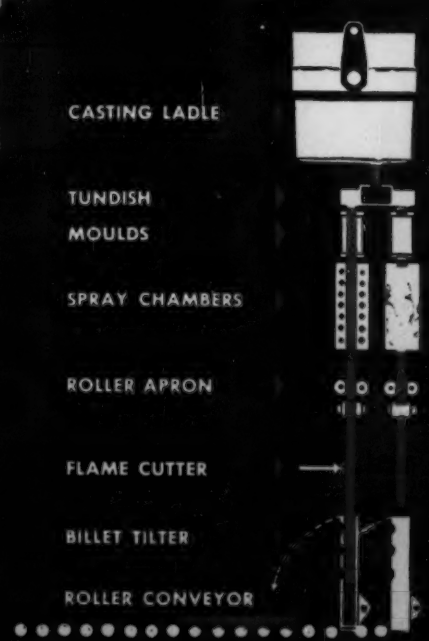
Tools plus AIRengineering increase output per man

DEMAG

CONTINUOUS STEEL CASTING PLANTS



EIGHT-STRAND CASTING PLANT

in full operation at the Terni iron and steel works in Italy since 1958

Developed to the Junghans system in co-operation with Messrs. Mannesmann and Böhler

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ANOTHER IN A SERIES
OF MOTOR FACTS
FROM ALL INDUSTRIES

"Roughest duty we have ever seen motors endure"

reports Marquette Iron Mining Co. of the Westinghouse Life-Line A motors in its Eagle Mills Pelletizing Plant

Operating continuously, 24 hours per day, dependable Westinghouse Life-Line® "A" motors drive a network of fans and conveyors at the Eagle Mills Pelletizing Plant of Marquette Iron Mining Co., Ishpeming, Michigan.

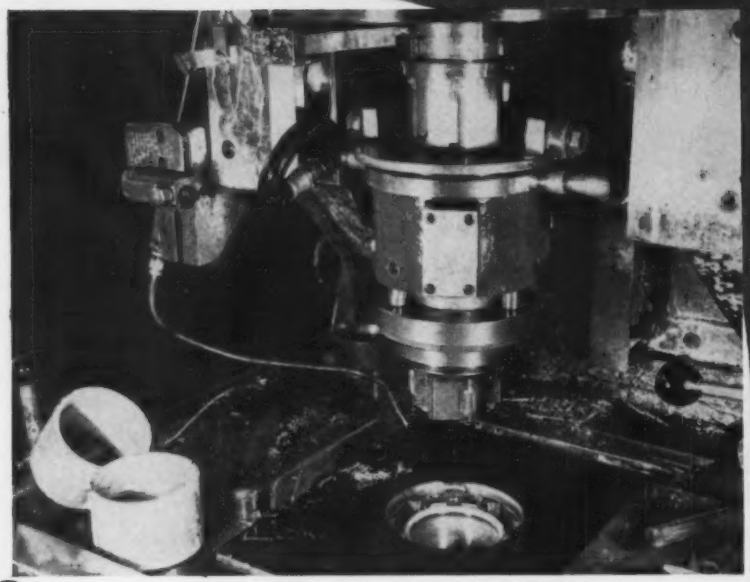
Some of these motors are located directly above a sintering machine where ambient temperatures often exceed 200° F and the motor is subjected to deposits of finely divided iron ore. Under these conditions, not a single motor breakdown or failure has occurred during 11 months of service.

Says Mr. Ed Gagnon, plant electrician, "Our Westinghouse motors have given us complete reliability on the roughest tests we have ever seen a motor endure."

For specific information about the ways your operation can benefit from the improved performance, longer life and reduced maintenance offered by the dependable Life-Line "A," contact your nearby Westinghouse sales engineer. Or write to Westinghouse Electric Corporation, P.O. Box 868, 3 Gateway Center, Pittsburgh 30, Pennsylvania. J-22077

YOU CAN BE SURE...IF IT'S Westinghouse

Deposits of powdered iron ore are no problem to this 2-hp Life-Line "A" motor driving conveyor which carries powdered iron ore to the balling disc where ½" pellets are formed. Presealed, prelubricated Life-Line "A" bearings keep dirt and other material out.



LANDIS TAP threads couplings 2½" - 6" dia.

The wide range of the LANDIS Tap resulting from its detachable-head design makes it an extremely versatile and effective threading tool. At the National Supply Co. in Etna, Penna., one LANDIS 4LL Tap is used for tapping many different diameters of straight and tapered threads in standard and A. P. I. line pipe couplings.

In the operation shown, this Tap on a Vertical Tapping Machine is threading conduit couplings of 4" galvanized H-40 Seamless Tube stock. 4.4191" pitch diameter Straight Pipe threads, 8-pitch, are tapped 3½" long straight through. 50 pieces are threaded per hour at a speed of 41 surface-feet-per-minute, and 400 pieces are completed between chaser grinds.

The detachable-head design of LANDIS Taps allows the use of various sizes of tap heads on the same tap body. As a result, a wide range of diameters may be threaded with a minimum tool investment. The 4LL Tap illustrated here, for example, using 7 different Tap Heads, will thread all coupling sizes from 2½" to 6".

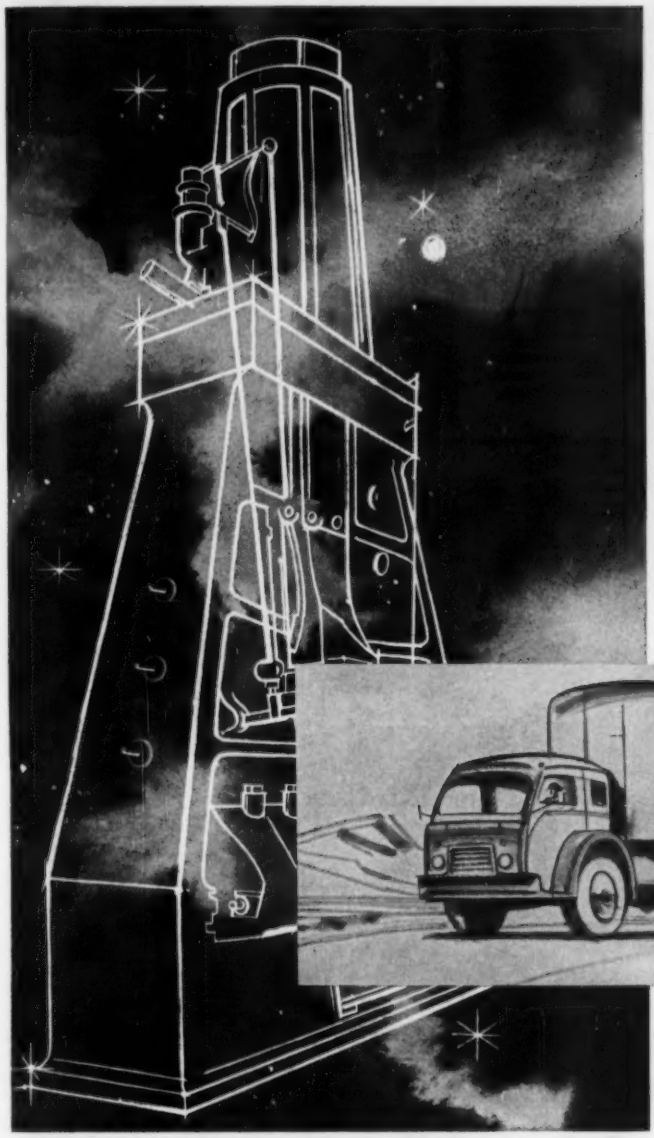
When producing tapered threads, the LL Tap features a mechanical receding action of the chasers. This reduces cutting strains by restricting cutting action to the chaser throat section and results in a precision conical thread.

For more complete information on LANDIS ALT Taps for straight threads, LANDIS LL Taps for tapered threads, and many other LANDIS Taps for special-purpose threading, write for Bulletins G-94 and G-95.

439

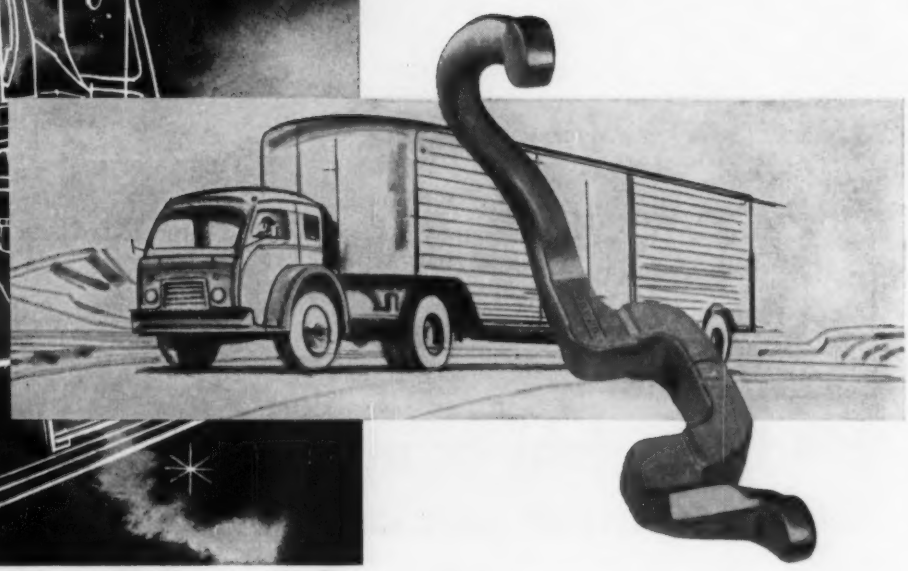
LANDIS *Machine* COMPANY

WAYNESBORO • PENNSYLVANIA • U. S. A.



Typical steam forging hammer

REQUIRED SAFETY FACTORS in steering arm assured by designing it to be forged



By designing with forgings, a truck manufacturer can count on the required safety factors, with minimum "beefing-up" of parts to offset unknown internal structures or non-homogenious materials.

You, too, can achieve results like these by designing *with forgings* either at the start or on re-design. The benefits of forgings are equally impressive, whether you make home-workshop equipment or diesel engines.

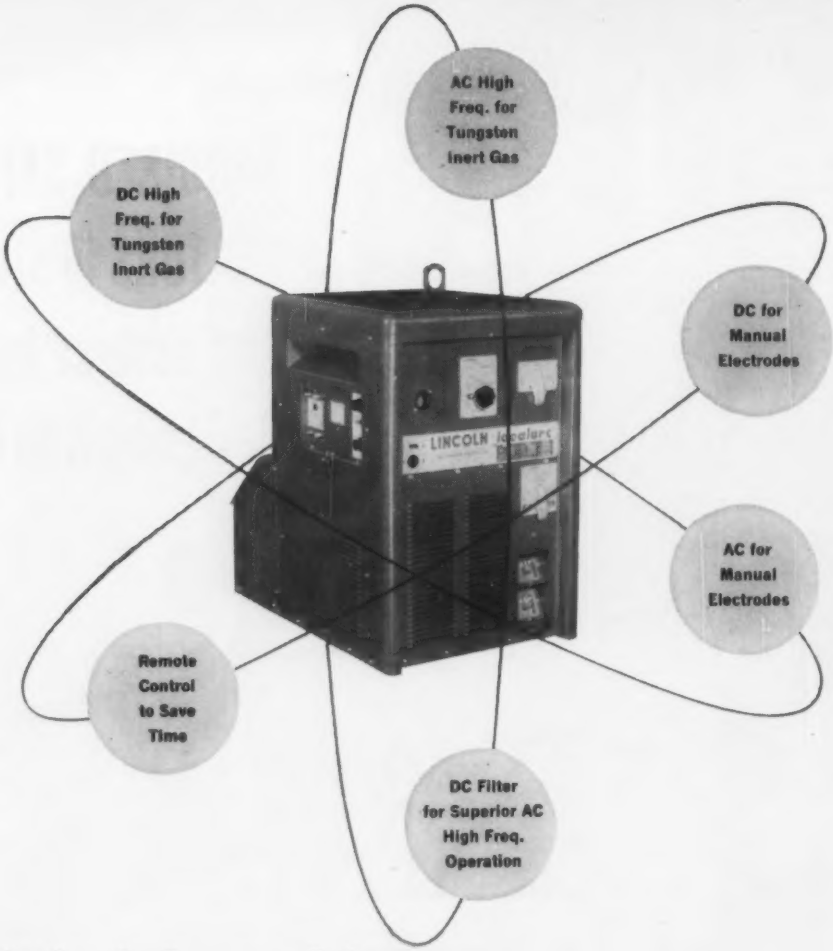
Forgings start as *better* metal . . . are further *improved* by the hammer-blows or high pressure of the forging process.

Write for literature on the design, specification, and procurement of forgings.

When it's a vital part, design it to be FORGED

Drop Forging Association • Cleveland 13, Ohio

Names of sponsoring companies on request to this magazine


AC High Freq. for Tungsten Inert Gas
DC High Freq. for Tungsten Inert Gas
DC for Manual Electrodes
AC for Manual Electrodes
Remote Control to Save Time
DC Filter for Superior AC High Freq. Operation
LINCOLN Idealarc

Weld little jobs or big . . . use inert gas or stick electrode . . . on AC or DC welding current, with "IDEALARC TIG"

At last, here is a welder which gives complete versatility to maintenance-welding departments or to job shop operations. The "Idealarc TIG", equipped with high-frequency and water and gas controls can be used for welding stainless or aluminum. With just a flick of a switch, the same machine can do production welding with AC stick electrodes or pipe welding on DC.

But, if your operation does not require complete versatility, you can still have the superior welding qualities of the "Idealarc TIG" without all the optional extras. That's because Lincoln lets you select (and pay for), just the features you need.

The NEMA-rated "TIG" model has welding current ranges of 10-450 amps on AC and 10-375 amps on DC. For complete information, write to us for Bulletin 4608.1.

Price:

$1041 *(in Zone 1)*

COMPLETE WITH:

- AC and DC Current Selection
- High Frequency
- Gas and Water Controls
- Balanced Wave Filter
- Power Factor Correction
- Remote Current Control

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The world's leading manufacturer of arc welders and electrodes, ac motors and battery chargers.

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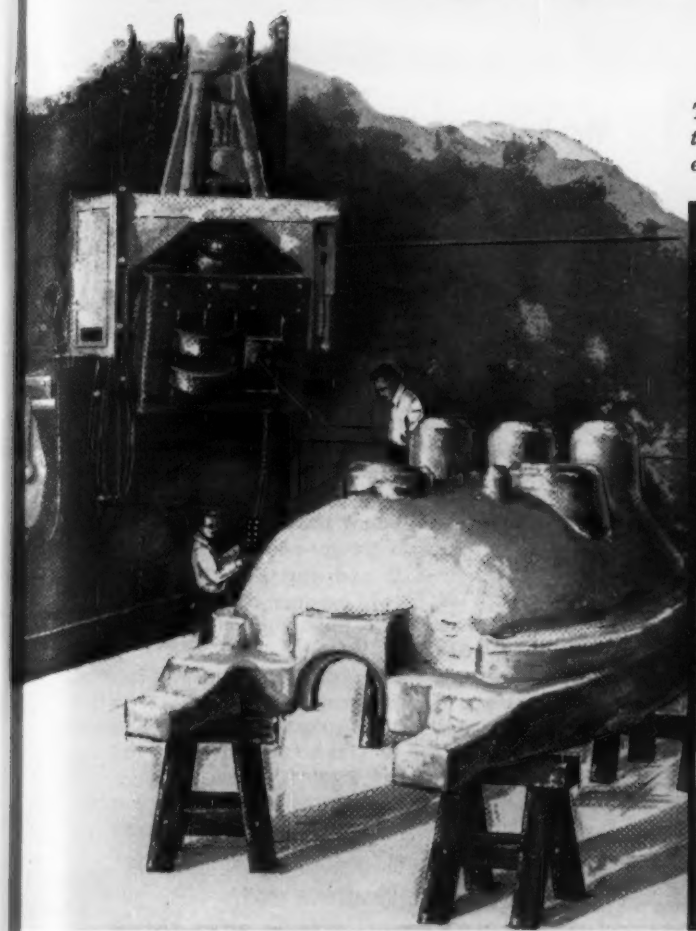
NON-DESTRUCTIVE TESTING ...the inside story



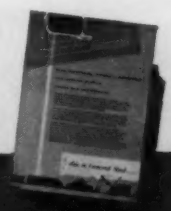
To insure the required quality throughout, the most modern non-destructive testing equipment is used at General Steel.

To meet rigid specifications for high temperature, high pressure and other applications requiring quality components, General Steel uses the most modern non-destructive testing equipment available. Testing for quality is performed by various methods depending on the type of structure.

Among the facilities available at General Steel are magnetic particle inspection units to check for invisible surface defects, and ultrasonic reflectoscope units for sonic testing of internal metal. Radiographic inspection of very heavy structures is done with 24-million volt Betatron units. Conventional X-ray equipment is used for smaller structures. Other methods of non-destructive testing are also available.

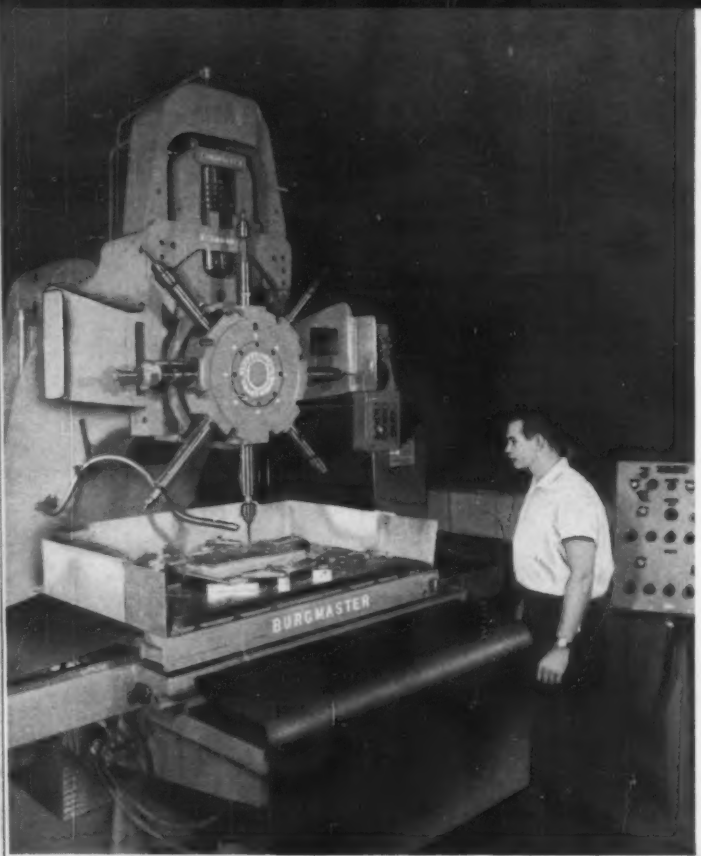
Profit from General Steel's wide experience in the design and production of high quality product components made of cast steel, cast-weld or composite structures. Let our staffs work with you in developing designs for optimum performance.

Write for folder **How General Steel Castings Can Improve Product Design and Performance.** General Steel Castings, Station 201 Granite City, Illinois



GENERAL STEEL CASTINGS

Tool Savings on Small Lots During
BURGMASTER *tape controlled*



Maximum Flexible Automation---

for Drilling, Boring and Tapping Lots of Any Size

At Rocketdyne, small lots are no limitation in putting a part into automatic production on the tape controlled Burgmaster machine. The fact is, small lots bring into sharp focus the basic advantages of performing all close tolerance hole machining operations by this method.

jigs are eliminated and simple standard clamps may be employed to hold the work.

costly tool room procedures for special tooling is greatly minimized.

lead time is reduced since it requires much less time to program a part, prepare the tape, make the setup and get into production.

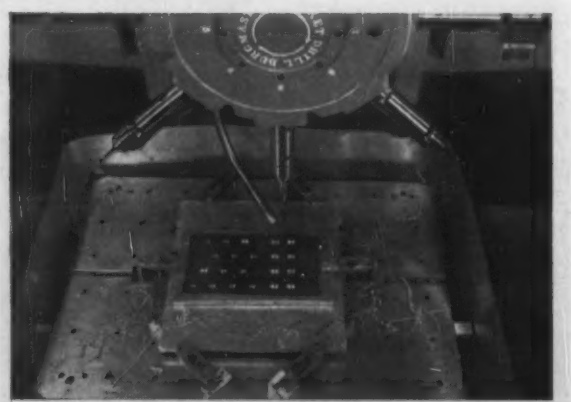
surer faster production is assured because the Burgmaster follows the tape command signals exactly, and continues machining to close tolerances in the fastest possible manner.

engineering changes are quickly put into production by the simple modification of a tape.

Speed Production, Cut Costs of Experimental or R & D Parts.

Less time, from the drawing board to the finished part—this is the simple formula that works to your advantage when producing lots of any size with the tape controlled Burgmaster Turret Drilling Machine.

268 operations on 100 holes are produced 8 times faster on this Rocket Instrumentation Panel. During machining, one tool change is made on two spindles. Note the simple holding clamps.



World's Largest Builder of Turret Drilling Machines

"O" Manual Power Index ½" Capacity

1C Manual Power Index ⅜" Capacity

2B Manual Power Index ¾" Capacity

2BF Flange Mounted Power Index ¾" Capacity

2BH Automatic Hydraulic ¾" Capacity

3BH Automatic Hydraulic 1½" Capacity

2BR Ram Type Radial Drill ¾" Capacity

2BHT-3BHT Automatic Tape Controlled ¾" and 1½" Capacity

1 Year Will Pay for $68,000.00

8 SPINDLE TURRET DRILL

Tool savings alone will pay for a $68,000 Tape Controlled Burgmaster Turret Drilling, Tapping and Boring Machine within a year, while producing small lots from 3 to 5 parts. In addition, the machine is producing up to 8 times more parts compared to conventional machining methods.

Time is the vital element in producing Research and Development hardware and production at Rocketdyne moves fast in order that parts in process will reflect improvements determined by latest tests. The tape controlled Burgmaster is an answer to getting into production fast and making engineering changes rapidly and inexpensively.

Parts are clamped on the 30" x 45" positioning table using an aluminum sub-base and simple clamps instead of expensive tooling with drill bushings. Table positioning is rapid and accurate, being automatically controlled by tape to accurately locate the work on two axis for each setting. The tape also controls the selection of proper spindle sequence and all machine functions. In addition, all standard adjustable Burgmaster controls are maintained including pre-selective spindle speeds, infinitely variable pre-selective feeds, selective rapid approach and return, skip indexing, precision depth control and simple manual controls for making fast set-ups. As a result, all operations are carried out at their most efficient rate for high finish, precision, speed and longest tool life.

INQUIRE TODAY at no obligation how you can save time with Automatic Tape Controlled Production. There is a Burg representative or dealer near you that will supply all the facts.

SEQUENCE OF 268 MACHINING OPERATIONS

Spindle No.	Tool	No. of Holes	Speed	Feed
1	No. 1 Centerdrill	72	2400	.003
4	No. 4 Centerdrill	28	2400	.003
2	.159 Drill	52	1540	.005
6	Tap 10-32NF-3B Tapmatic Head	52	330	.031
7	.136 Drill	16	2400	.003
3	Tap 8-32NC-3B Tapmatic Head	16	330	.031
5	1.06 Drill	10	490	.003
8	.75 Drill	11	770	.003
1*	.406 Drill	7	1200	.004
4	.218 Drill	4	2400	.004

* NOTE: Tape is programmed to stop machine after drilling eleven .75 Holes with Spindle No. 8. Tools are changed on Spindles No. 1 and No. 4 per above chart, then automatic tape controlled operation is resumed by depressing the start button on the master panel to complete the last 11 holes.

Job Facts

Machine: Burgmaster 3BHT 8-Spindle Turret Drilling, Tapping and Boring Machine with 30" x 45" Positioning Table and GE Tape Controls.
Company: Rocketdyne, a Division of North American Aviation, Inc., Canoga Park, California.
Part: Rocket Instrumentation Panel.
Material: 1020 steel plate, ¼" x 9" x 18".
Operations: Centerdrill and drill 100 holes, tap 68 holes: a total of 268 operations.
Holding: Standard clamps.
Quantity: Five parts.
Accuracy: Table positioning to ±.001".
Former Method: Line of single spindle drills using drill jig.
Former Time: One part per day.
Present Time: Eight parts per day.
Advantages: Increased production 8 to 1, lead time drastically reduced, tool saving alone will approximately pay for $68,000.00 Burgmaster Machine within a year.

Write for Bulletin describing Burgmaster 6 and 8 spindle Tape Controlled Turret Drilling, Tapping and Boring Machines. See Burgmaster Machines in action: Thirty-minute 16mm sound film showing all Burgmaster Turret Drills in operation is available from any Burg office without charge.

Automatic
trolled
" Capacity

BURG TOOL
MANUFACTURING COMPANY, INC.
15001 South Figueroa Street, Gardena, California
FAculty 1-3510 DAvis 9-4158

BURGMASTER

BURGMASTER DIRECT SALES OFFICES:

Ridgewood, N.J.
86 North Maple Ave.
Gilbert 4-3002

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5329 Lincoln Ave.
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Cleveland 7, Ohio
14706 Detroit Ave.
ACademy 6-7030

Detroit 37, Mich.
13730 W. Eight Mile Rd.
Lincoln 8-4333

San Francisco, Calif.
1341 Old County Rd.
Belmont, Calif.
LYtle 1-0309

Plus dealer representatives in other industrial centers.

integrated CRUCIBLE steel service

Average Crucible warehouse stocks these and many other specialty steel items in a tremendous range of sizes and analyses. A single phone call will bring any or all of them to you *in the quantity you need.*

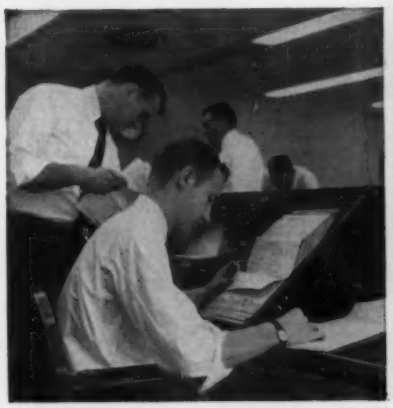
keeps 16,000 specialty steel items flowing from mills to local warehouses for immediate delivery to you

Every day, thousands of specialty steel items flow from Crucible mills to Crucible's 32 strategically located warehouses — keeping local stocks at levels that meet customers' *maximum* needs.

Here's how these continually-replenished stocks are helping one steel buyer today. He says:

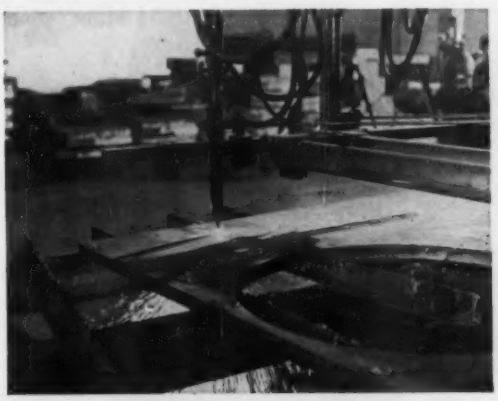
"We reduced plant inventory to cut operating costs and free working capital and space. This is smart business. But it creates problems, too—like when production requisitions an extra-large order of 36" x 120" Type 304 stainless sheet, 20 ga and 2B finish — *and needs it overnight.* I solve this problem by calling the Crucible warehouse. It's set up to give us the kinds of steels we need from stock."

All 32 Crucible warehouses offer in-stock delivery of approximately 16,000 specialty steel items, ranging from tool steels to stainless sheet and wire. They're able to maintain these high inventories because they're part of Crucible's completely integrated operation, from mining the ore to steelmaking to warehouse delivery to you. If you'd like to know all the ways these warehouses can serve you, phone or visit the one near you today. *Crucible Steel Company of America, Dept. PK06, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*



Inventory specialists keep warehouse stock records up-to-date to give you fast, accurate answers on availability of every analysis.

Steels you ordered yesterday arrive today at your receiving platform — dependably on schedule.



Warehouses maintain modern equipment, like this electronically-controlled flame cutter, for fast processing of specialty items.

STOCK LIST

Keeps you up-to-date on local stocks of specialty steels. Just ask the Crucible salesman to place your name on the regular mailing list.

One Source For All These Steels

TOOL STEELS — Water, oil, air hardening, shock resisting, hot work, plastic and die casting steels in all forms, including bars, sheets, plates, drill rod, hollow bars, forgings and flat ground stocks

HIGH SPEED STEELS — Crucible's famous "Rex"® steels: Rex Thrift Finish rounds, hot rolled and cold drawn flats and squares, drill rod, forgings, sheets, plates, and tool bits

STAINLESS STEELS — Bars, sheet, strip, wire, cold heading wire, metalizing wire, plates, angles

FREE MACHINING STEELS —Crucible Max-el® rounds, hexagons, plates and brake die steel

ALLOY STEELS—Bars, billets, strip and sheet

COLD ROLLED CARBON SPRING STEELS

DRILL STEELS—Hollow and solid drill steels

ALUMINUM EXTRUSION DIE STEELS

HOLLOW TOOL STEEL

HARD FACING ROD

PLASTIC MOLD STEELS

PERMANENT MAGNETS

—and many others

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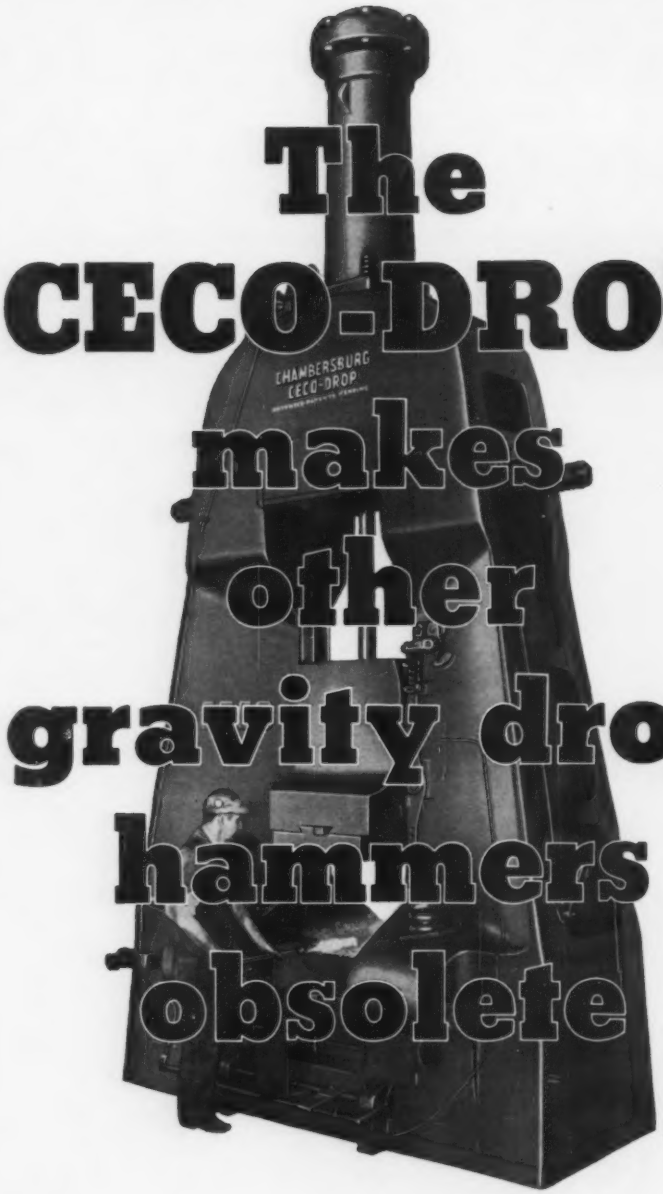
The CECO-DROP makes other gravity drop hammers obsolete

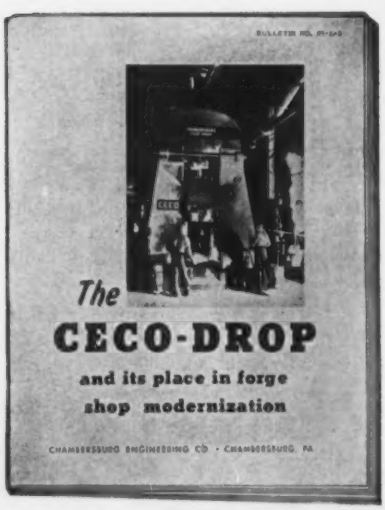


THIS is no mere slogan; it is a statement of fact. Since its introduction twelve years ago, the Ceco-Drop, in installation after installation, has proved its greater productive capacity and its economy over any other gravity drop hammer.

These are not unsupported claims. They are backed up by testimonials from users: like **"increased production over board drop between 10-20%"**; "die life on the Ceco-Drop is nearly double"; **"the first two Ceco-Drops have saved approx. $3000 each** in maintenance and boards in first year"; "after approx. 1200 production hours, one Ceco-Drop had total of less than 10 hours maintenance"; **"I would give a good deal if I had all of our board hammers out of the shop and nothing but Ceco-Drops"**; and hundreds of others.

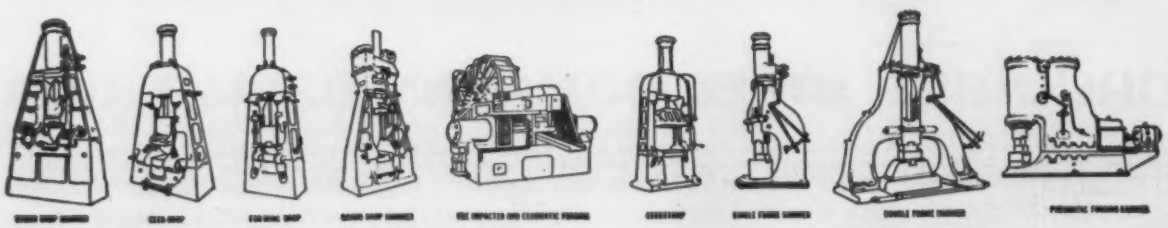
To convince yourself, you should read Chambersburg's 28-page bulletin on Forge Shop Modernization.

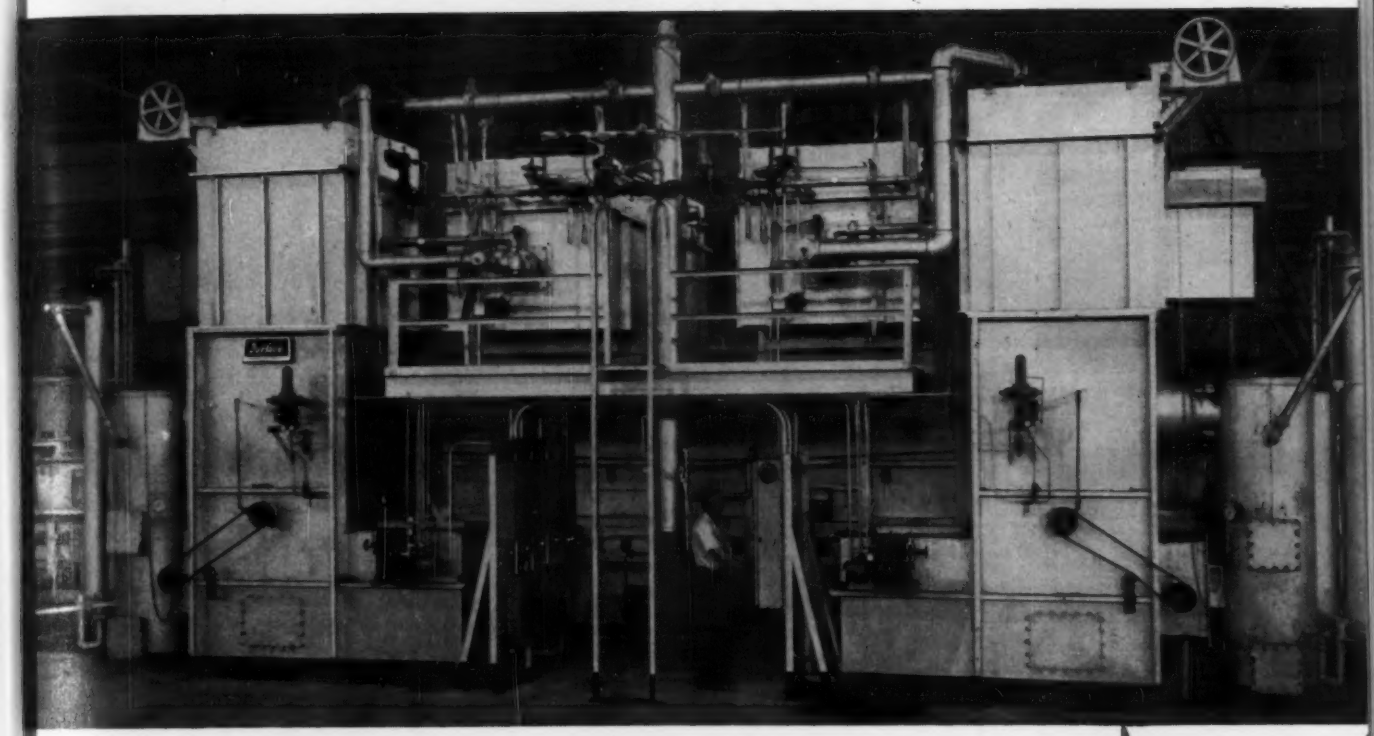
Send for your copy today.



CHAMBERSBURG ENGINEERING COMPANY . . . . . CHAMBERSBURG, PENNSYLVANIA

CHAMBERSBURG • The Hammer Builders





SURFACE POWER CONVECTION

speeds annealing rate to 8,000 lbs/hr of brass tubing

This furnace is one of Scovill Manufacturing Company's (Waterbury, Connecticut) answers to the threat of imported brass and copper mill products.

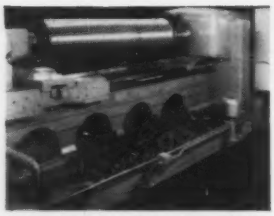
Scovill is after new highs in production and quality in its new streamlined tube mill at New Milford, Conn. This continuous roller hearth furnace, equipped with Surface Power Convection, helps achieve both goals. It anneals and cools 8,000 lbs. of brass and cupro-nickel tubing an hour. At the same time, it produces tubing of superior physical properties because it maintains temperature uniformity at plus-minus 8° F.

Such process speeds and temperature uniformity are possible only with Surface Power Convection, the most important advance in convection heat transfer in 20 years. Ask your Surface representative how you can apply this profitable new technology to your products. Write for Bulletin SC-182.

SURFACE COMBUSTION CORPORATION • 2373 Dorr Street, Toledo 1, Ohio
In Canada: Surface Industrial Furnaces, Ltd., Toronto, Ontario

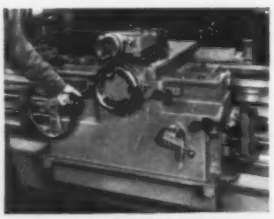
Surface

wherever heat is used in industry



Chip flow to the rear of the machine for easy removal.

36 spindle speeds in a range of 8 to 1000 R. P. M.



Four-way variable speed power rapid traverse.

Power tailstock positioning on flame hardened bed ways.

No chip pan obstruction at front of machine.

Tailstock design permits setting compound rest parallel to work axis.

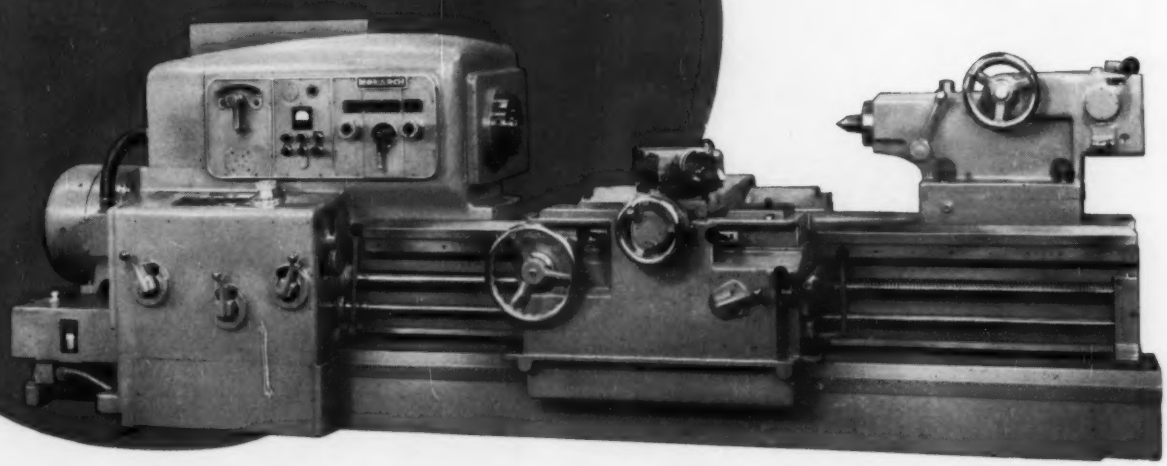
Check the Model 3220, feature for feature, against any other heavy duty lathe of similar swing capacity. Here are the major plus values. Add them up and you get only one answer — greater productivity hour after hour — day after day — year after year. This is worth investigation!

	Monarch Model 3220	Other 25" Or Model 3220 Machines
Number of spindle speeds	36	?
Speed range	8 to 1000 R. P. M.	
Surface cutting speed automatically calculated	Yes	
Hole in headstock spindle	3 ⅞"	
Spindle jog	Automatic	?
Headstock lubrication	Mist	
Attention-free hydraulic clutch and brake	Yes	
Swing over bed and carriage wings	32"	
Bed width	26½"	?
Totally enclosed end gearing	Yes	
Four flame hardened and precision ground bed ways	Yes	
Chip flow to rear for easy removal	Yes	
Chip pan obstruction at front	No	?
Automatic traveling rod supports	Yes	
Variable speed power rapid traverse to carriage and cross slide	Yes	
Automatic disengagement of apron handwheel and cross feed dial during traverse	Yes	?
Apron handwheel and cross feed dial pick-up at same spot after traverse	Yes	
Feed range	.003" to.1683" per rev.	?
Backlash eliminator when using taper attachment	Yes	
Tailstock spindle diameter	6½"	
Power tailstock positioning	Yes	?
Anti-friction tailstock spindle suitable for drilling, tapping and reaming	Yes	
Tailstock design permits setting compound rest parallel to bed ways	Yes	?
Stock removal, cu. in. per minute, up to	92	
Net weight of base length (48") machine	19,660 lbs.	

YOU GET MORE...
YOU PRODUCE MORE

with the Monarch Series 80
Heavy Duty Dyna-Shift Lathe—Model 3220

(OLDER DESIGNS DESIGNATED AS 25" LATHES)



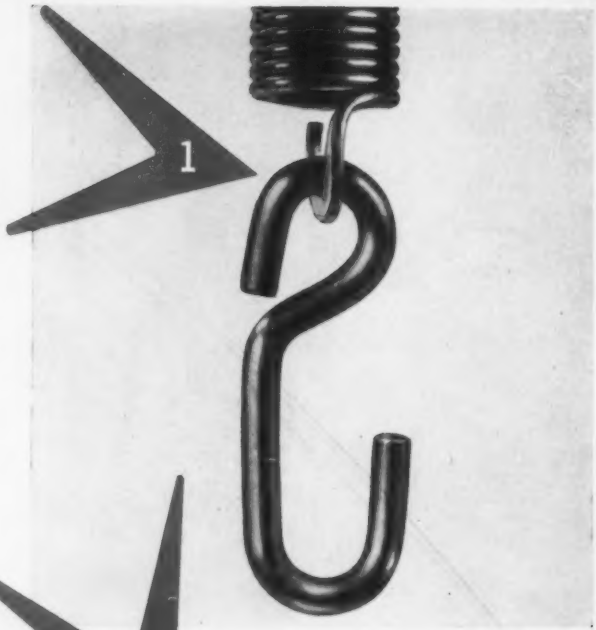
You'll suffer — competitively — if you tool up today with yesterday's lathes for the boom of the Soaring Sixties. The Monarch Series 80 is truly the lathe of tomorrow, as are the other new Monarch high production and special purpose lathes. Send for our illustrated Booklet #1603 for full Series 80 information — or state your other interests.

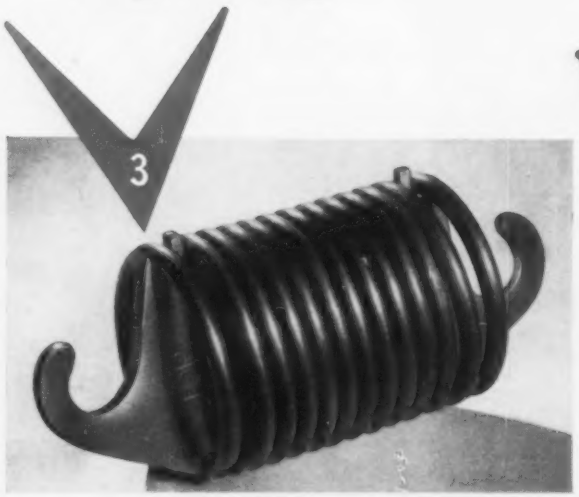
Monarch
TURNING MACHINES

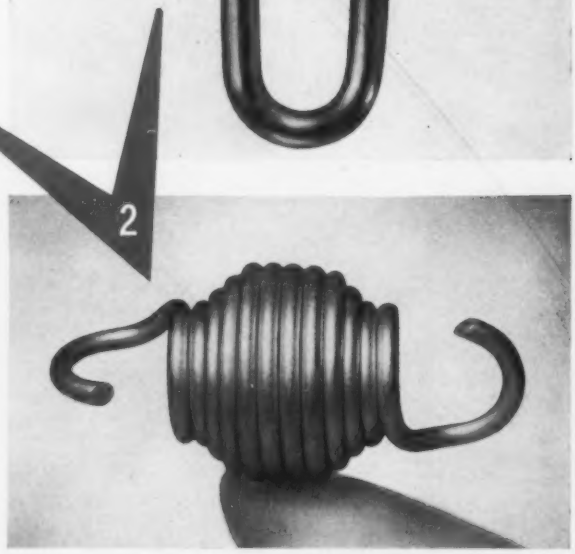
THE MONARCH MACHINE TOOL COMPANY, SIDNEY, OHIO

IF IT CAN BE TURNED, THERE'S A MONARCH TO DO IT BETTER AND FASTER

Why it pays to look at the end in the beginning







1. In this pick-arm spring for a textile machine, natural frequency vibration plus rigid end restraint caused early failure. By redesigning spring and adding swivel hook to end assembly, failure was avoided and cost reduced as well.

2. Fatigue failure caused by bending stresses occurs where end hooks join working coils. In this method of reducing the combined stress, two coils at each end are wound with a reduced diameter.

3. Another method for reducing stress concentration where end hooks join coils is to thread a flat stamping into end coils.

Here are a few examples of why it pays to call on the springmaker early in your design problems. End-hook failure of extension springs is a common occurrence that experience can help avoid. Check your specifications for performance and production economy by consulting an A.S.C. spring engineer. Write for bulletin "How to Solve Your Spring Design Problems."

5903

Associated Spring Corporation

General Offices: Bristol, Connecticut

Wallace Barnes Division, Bristol, Conn. and Syracuse, N. Y.
B-G-R Division, Plymouth and Ann Arbor, Mich.
Gibson Division, Chicago 14, Ill.
Milwaukee Division, Milwaukee, Wis.
Raymond Manufacturing Division, Corry, Penna.
Ohio Division, Dayton, Ohio
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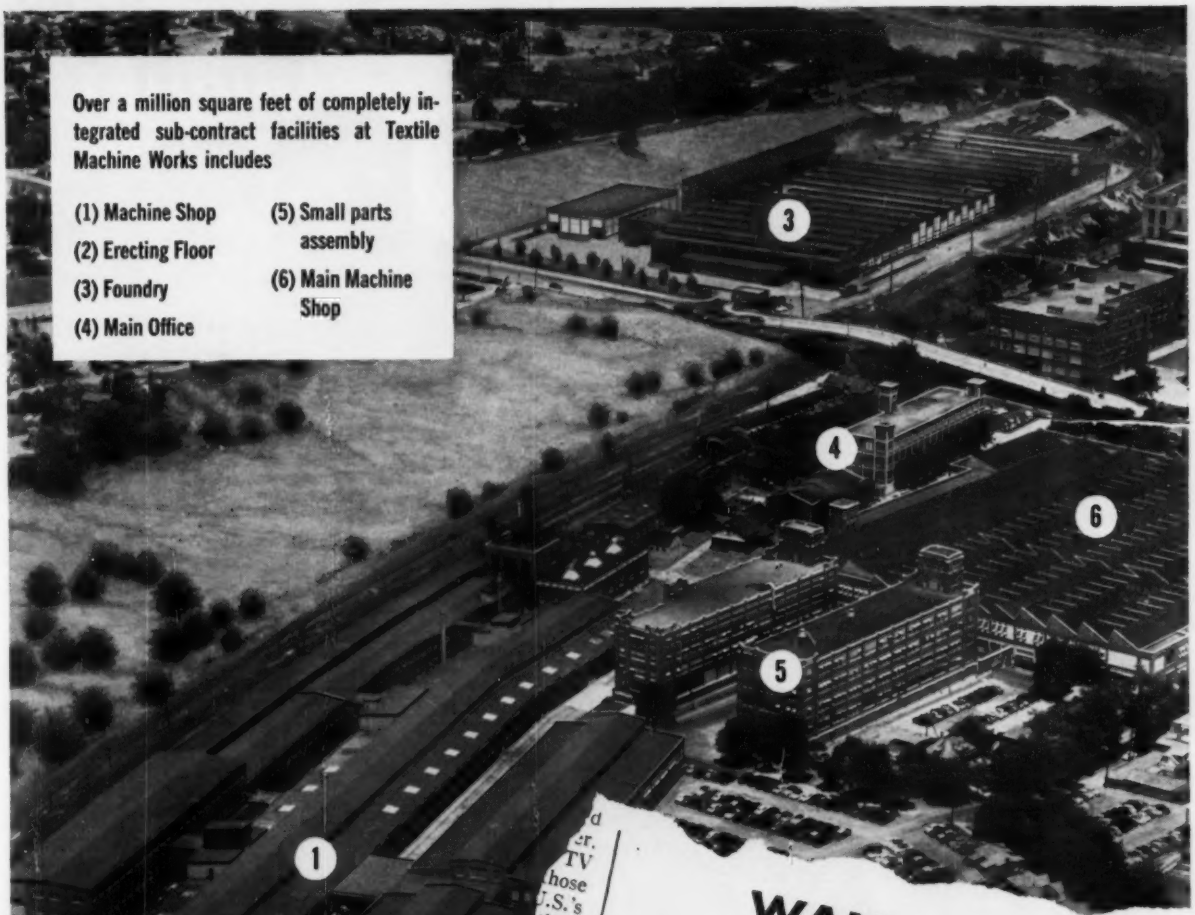
San Francisco Sales Office, Saratoga, Calif.
Seaboard Pacific Division, Gardena, Calif.
Cleveland Sales Office, Cleveland, Ohio
Dunbar Brothers Division, Bristol, Conn.
Wallace Barnes Steel Division, Bristol, Conn.

Canadian Subsidiary: Wallace Barnes Co., Ltd., Hamilton, Ont. and Montreal, Que. Puerto Rican Subsidiary: Associated Spring of Puerto Rico, Inc., Carolina, P.R.



WANTED

(by one of the largest, most modern and completely integrated manufacturers in the U.S.)

Production machining on a job or long-term basis; contracts for precision components, assemblies and complete machine building.

QUALIFICATIONS: 65 years' experience in precision (tolerance to 10ths) manufacturing, 1200 modern machine tools, a completely mechanized foundry (one of the country's largest), 3000 skilled craftsmen including a corps of industry's top designers and engineers.

REFERENCES: The best . . . companies like Alcoa, Du Pont, Chrysler, Eastman Kodak, Western Electric, Fairchild Aircraft, Ingersoll-Rand and others who know they can depend on TMW for quality, accuracy and on-time delivery at minimum costs.

For more details, or for new Facilities File Folder call or write today.

TMW

TEXTILE MACHINE WORKS
CONTRACT DIVISION, READING, PENNA.

R/M POLY-V® DRIVE MEETS HEAVIEST LOAD REQUIREMENTS

Poly-V®
Drive Specifications
for 2500 Ton
Erie Forging Press:

Poly-V* Belt "M":
301″ P.L. x 9″ wide,
24 ribs.
Driver Sheave: 17″
P.D. 68″ Diameter
Flywheel.
100 Horsepower.

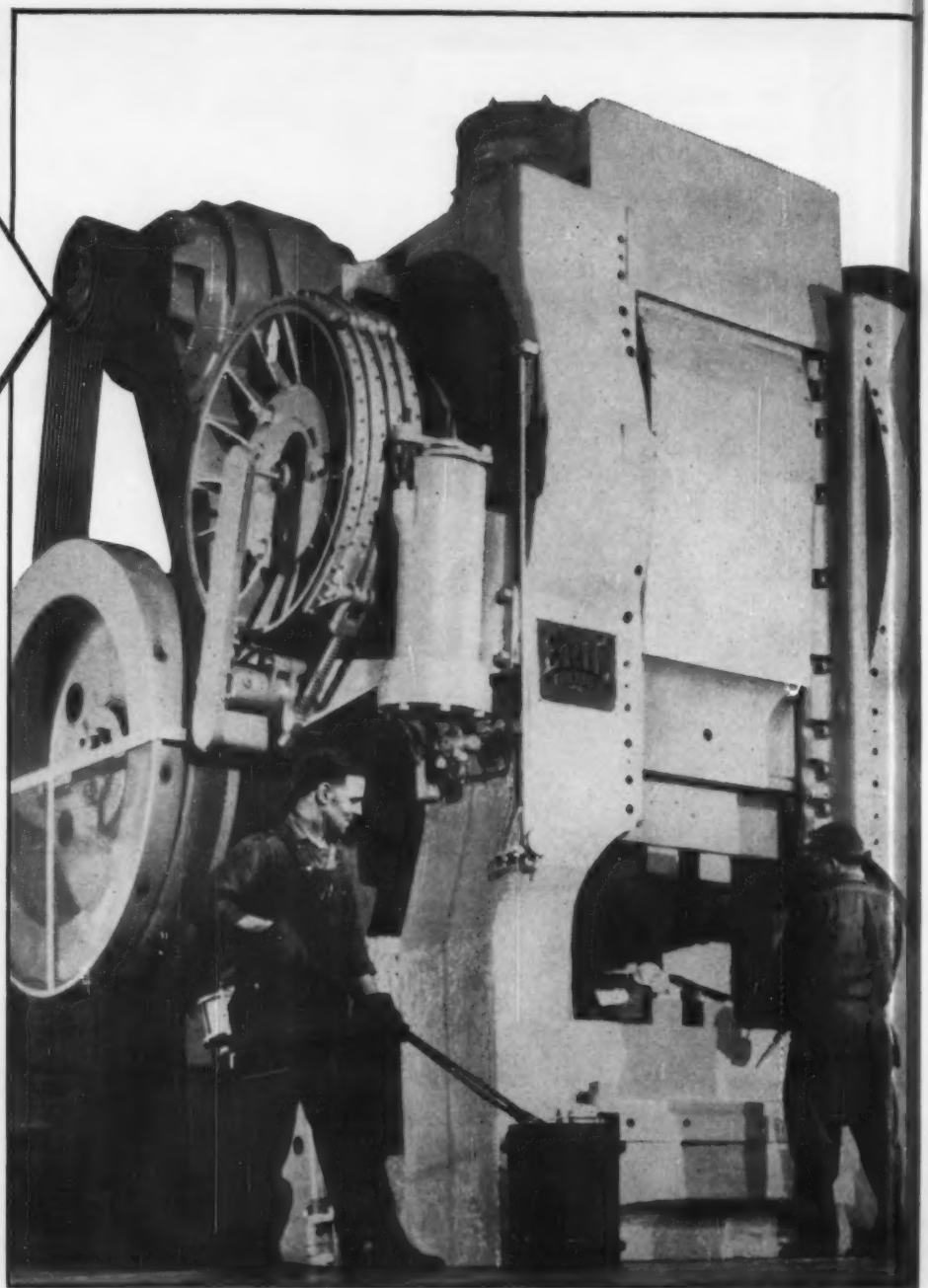
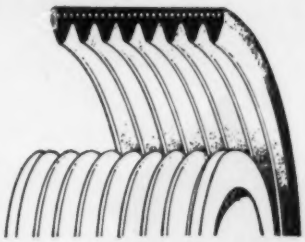


Photo Courtesy Erie Foundry Co.

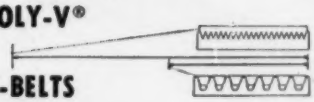
R/M POLY-V* DRIVE...MORE USE PER DOLLAR

Compact Poly-V Drive delivers power to spare for this huge 2500 ton forging press, newly introduced to industry by Erie Foundry Company. R/M's patented drive design provides the higher horsepower capacity . . . more power per inch of drive width than ever before possible! Because it employs a single, endless V-ribbed belt running on sheaves specially designed to mate precisely with the belt ribs, Poly-V delivers up to 50% more power than ordinary V-drives of equal width . . . or equal power in as little as ⅔ the width. Poly-V Drives have narrower sheaves . . . less shaft overhang . . . less drive weight to meet *every* heavy duty application.

Poly-V's single unit belt design eliminates multiple-belt "length matching" problems, too. Belt speed ratio and belt position remain constant from no load to full load . . . assure smoother, cooler running—less wear on belts *and* sheaves! Just two belt cross sections meet every heavy duty drive requirement. Ask an R/M representative to help determine the R/M Poly-V* Drive specifications for your power driven equipment. Or write for Bulletin #M141.

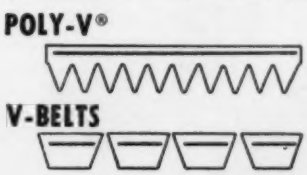


POLY-V GIVES GREATER POWER CAPACITY because it has *twice* the contact area with *half* the face pressure.

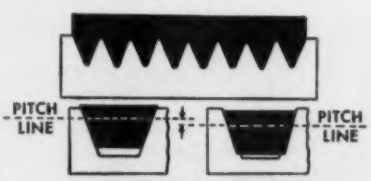


COMPARE: Measure the two bold lines to see the greater contact area of Poly-V* belt in the sheave.

AND POLY-V* has uninterrupted strength member of new high strength synthetic cord. Poly-V* is a single unit with even, uniform pull.

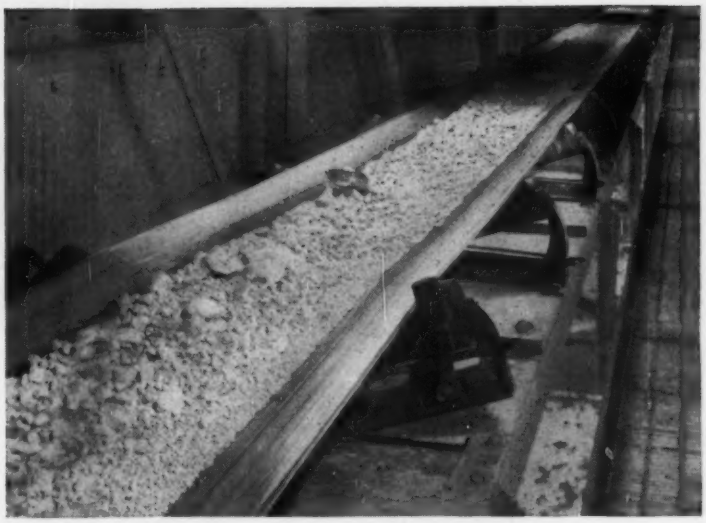


POLY-V* maintains constant pitch diameter under all loads. Speed ratio is unchanged. Belt position remains constant from *no* load to *full* load.



MORE POWER in SAME SPACE
or
EQUAL POWER in LESS SPACE

*Poly-V is a registered Raybestos-Manhattan trademark.



R/M CONVEYOR BELTS FOR LONGER SERVICE

Extra flexible Ray-Man trains naturally, troughs easily... handles fuller, *heavier* loads even where narrow belts and small pulleys are required. Holds fasteners under severe conditions of use, requires no breaker strip. For severe shock loading, R/M makes extra-cushioned Homocord... and R/M Tension-Master for extra long lifts, high tensions. Exclusive "XDC" Cover protects R/M heavy duty belts against wear, tear, cuts and abrasions. Write for Bulletin #M302.

ALLFLEX HOSE IS STRONG *AND* FLEXIBLE

Exclusive engineered advantages of Allflex hose add up to easier handling, longer life... lower hose costs for a variety of uses. This versatile, all-purpose construction has no pre-set twist... coils and uncoils freely in any direction. Uniform inside and outside diameters assure safer, easier coupling. One of a complete line of quality R/M hose constructions for general and special purpose use... engineered for "More Use per Dollar" on every job ! Write for Bulletin #7075.

RM 917

BELTS • HOSE • ROLL COVERINGS • TANK LININGS • INDUSTRIAL RUBBER SPECIALTIES

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Other R/M products: Abrasive and Diamond Wheels • Brake Blocks and Linings • Clutch Facings • Asbestos Textiles • Mechanical Packings • Engineered Plastics • Sintered Metal Products • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls

Illustrated above are only a few of the many different sections in the standard range held. In point of fact, almost any practicable shape can be supplied on request.

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Have you received your current copy of The Albion Machinery Catalogue? If not, write for one today. This catalogue contains a comprehensive stock list of all new and secondhand Plant and Machinery, including Machine Tools, Contractors' Plant, Generating Sets and Pumps. It is regularly brought completely up to date and reprinted.

GPLT.

UNITED®

6–Stand continuous horizontal and vertical Billet Mill

UNITED ENGINEERING AND FOUNDRY COMPANY
PITTSBURGH, PENNSYLVANIA

Plants at Pittsburgh, Vandergrift, Youngstown, Canton, Wilmington

SUBSIDIARIES: Adamson United Company, Akron, Ohio; Stedman Foundry and Machine Co., Inc., Aurora, Indiana

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

EC-1357 cuts costs, makes possible stronger sandwich panels

LABORATORY TESTS show EC-1357 provides the high strength and rigidity called for in nonload-bearing sandwich structures.

3M Adhesive EC-1357 bonds all kinds of skin and core materials *without heat.* You'll speed production, cut costs, build in high strength for non-load-bearing sandwich panels.

You can force-dry the solvent out of the adhesive prior to bonding. And a nip roller or cold press is all that is required to complete the bond.

EC-1357 provides maximum immediate strength. And the bond continues to strengthen as it cures at room temperatures.

Dark in color, EC-1357 absorbs infrared heat quickly, dries fast; so no production delay is necessary. And it sprays on with minimum cobwebbing, thus saving materials.

SEE WHAT 3M ADHESIVES CAN DO FOR YOU!

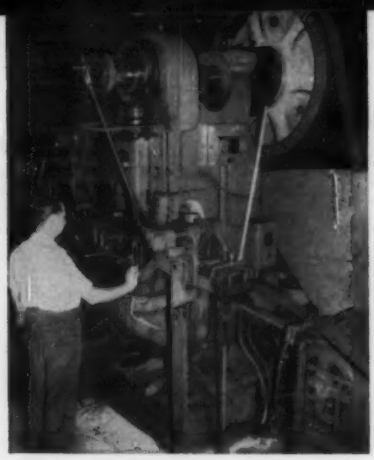
Consult 3M Research. Contact your 3M Field Engineer. Or, for information and free literature, write: A.C.&S. Division, 3M, Dept. YP-119, St. Paul 6, Minnesota.

ADHESIVES, COATINGS AND SEALERS DIVISION

MINNESOTA MINING AND MANUFACTURING COMPANY

...WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY



Hager slits large coils *of Youngstown cold-rolled sheets to proper width, feeds the sheets to hinge blanking machines, then finish forms the hinge and electrolitically applies various surface coatings.*

Accent on Excellence

Youngstown cold-rolled sheets

"Everything hinges on Hager!"— no idle boast for C. Hager & Sons Hinge Mfg. Co. of St. Louis, Missouri. This 110-year-old hinge manufacturer enjoys top ranking in its field, and a fine reputation among hardware people, architects and builders everywhere.

Youngstown cold-rolled sheets contribute in no small way to Hager product acceptance and reduced manufacturing costs. "Very good gauge, unusually good surface", Hager reports, with Youngstown cold-rolled sheets sharing responsibility for low reject rates, fast, accurate forming, lowered fabrication and die costs.

Wherever steel becomes a part of things *you* make, the high standards of Youngstown *quality*, the personal touch in Youngstown *service* will help you create products with an "accent on excellence". The Youngstown Sheet and Tube Company, Youngstown, Ohio. Carbon, Alloy and Yoloy Steel.

QUALITY · YOUNGSTOWN · SERVICE

Youngstown

HIGHER BONDING STRENGTH

WITH KAISER BASIC BRICK FOR THE STEEL INDUSTRY

Exceptionally high strength at critical intermediate temperatures (1400°F to 1850°F) . . . that's the unique advantage you get with Kaiser unburned brick!

When the internal temperature of bricks in a furnace structure reaches the point where the chemical bond is destroyed, brick strength reaches its lowest point and cracking and spalling losses may result. In the chart, note the high crushing strength after firing in the intermediate range. This denotes strong bond at all temperatures — a unique feature of Kaiser unburned bricks.

The Difference: Solid State Reaction

With Kaiser brick, there is no "liquid phase" in the formation of the ceramic bond. Kaiser's use of volatized silica (particles as fine as cigarette smoke) promotes a **solid state reaction** at lower temperatures which starts to form the ceramic bond **before** the chemical bond burns out. Result: **higher** bonding strength, **higher** resistance to thermal shock and mechanical abuse in furnace charging.

Solid state reaction also gives Kaiser brick outstanding resistance to distortion and shrinkage. Excellent resistance to chemical attack by furnace fumes, iron oxides and slags is assured by high MgO content, maximum brick density and chemically stable composition.

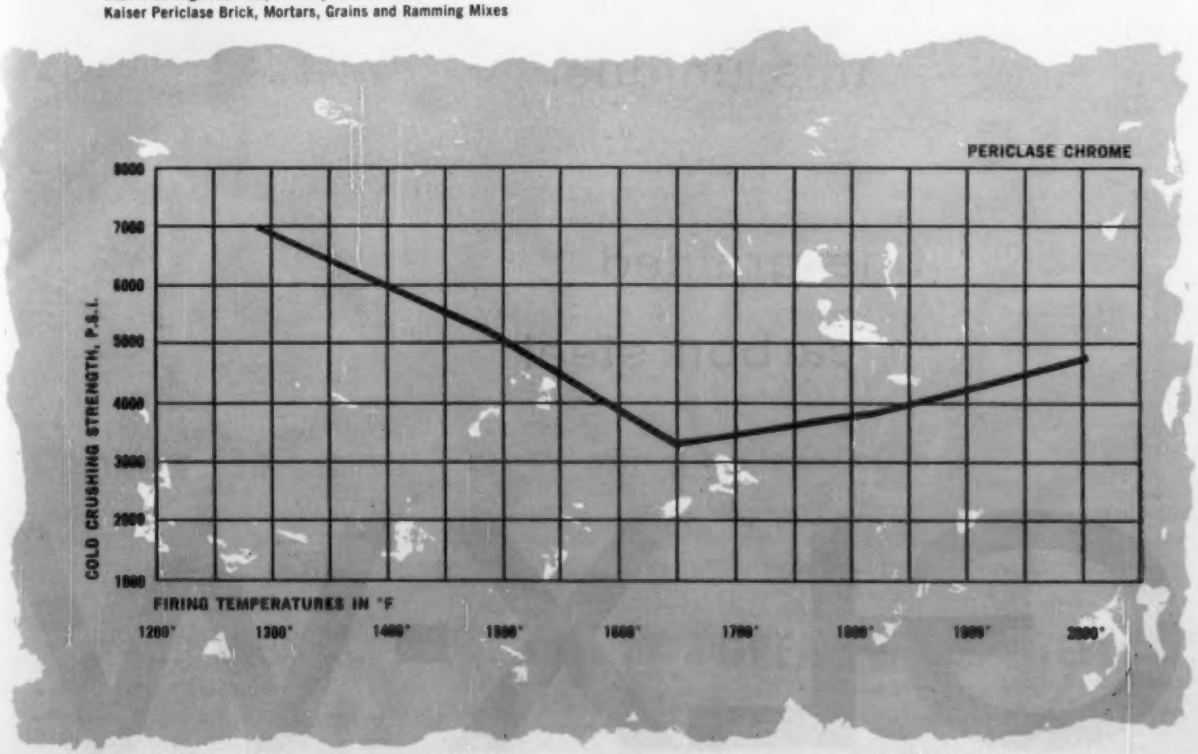
Make your own comparison tests and see how much more performance you get with Kaiser Basic Brick. And ask to see the new 30-minute color movie "Progress In Modern Basic Refractories." Your Kaiser Chemicals Sales Engineer or Regional Office will be glad to make the arrangements.

Call or write Kaiser Refractories & Chemicals Division, Dept. S9133, Kaiser Aluminum & Chemical Sales, Inc., at any of the Division Offices listed below:

PITTSBURGH 22, PA. . . . . 3 Gateway Center
MEXICO, MISSOURI . . . . . Mex-R-Co Building
OAKLAND 12, CALIF. . . . . 1924 Broadway

KAISER REFRACTORIES

MEX-R-CO High Alumina, Fireclay and Silica Refractories
Kaiser Periclase Brick, Mortars, Grains and Ramming Mixes



Columbium

makes possible

this unique

new

fine-grained

carbon steel

GLX-W

Compare fine-grained GLX-W with the steel you use

Great Lakes adds a precise amount of columbium to good-quality carbon steel. The result is fine-grained GLX-W steel. Here's how GLX-W compares with mild carbon steels . . .

- GLX-W is 50-100% stronger
- Has greater notch toughness
- Has excellent weldability
- Is as ductile as other carbon steels
- Permits designers to reduce weight up to 35%.

For proof on how GLX-W can cut your production costs, write, wire or phone Great Lakes Steel Corporation, Product Development Division, Department BW.

GLX W

GREAT LAKES STEEL

Detroit 29, Michigan

A DIVISION OF NATIONAL STEEL CORPORATION

Atlas Steels' *26" 2-high reversing blooming mill*

speeds production under the **BIRDSBORO** *trademark*

And that trademark has come to mean quite a lot to steel producers in the U.S., Canada, Europe and other points on the globe. The strength and ruggedness demanded by the steel industry are blended with the advanced thinking and modern design ideas of the BIRDSBORO engineers. The result is productive and profitable mill machinery with a long, useful service life. The BIRDSBORO representative in your area can cite specifics. You'll find them very interesting. *Sales Department, Engineering Department and Plant:* Birdsboro, Pa., *District Office:* Pittsburgh, Pa.

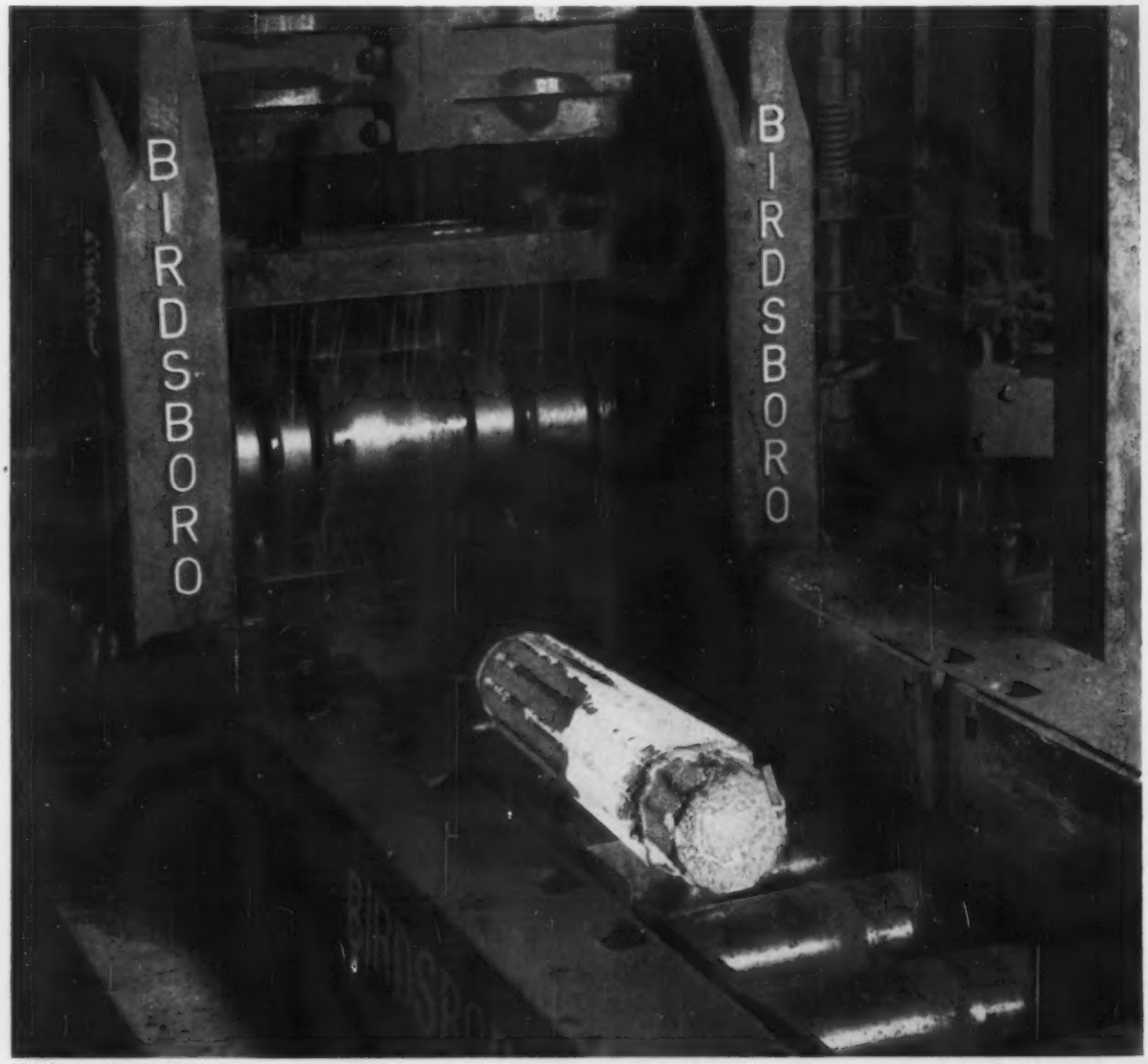
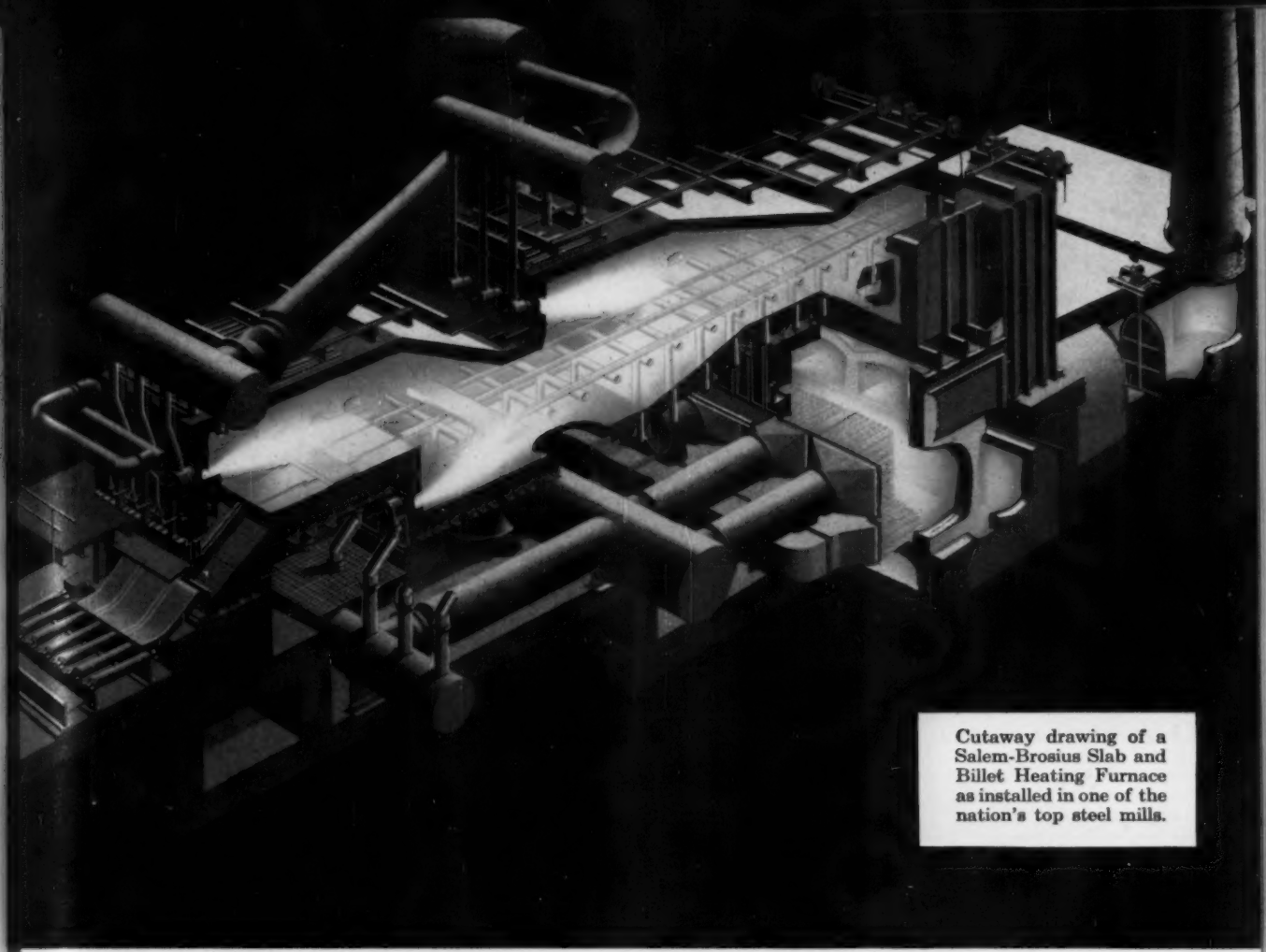


Photo Courtesy Atlas Steels Limited

BIRDSBORO

STEEL FOUNDRY AND MACHINE CO.

STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS • Weldments "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel



Cutaway drawing of a Salem-Brosius Slab and Billet Heating Furnace as installed in one of the nation's top steel mills.

In this Salem-Brosius furnace better steel products are born

All over the country, steel producers are turning to Salem-Brosius Pusher-Type Slab and Billet Heaters, because they have come to know that these furnaces will produce maximum tonnages of evenly heated, accurately temperatured steel at the lowest fuel consumption rate. The triple-fired furnace shown above features accurately controlled heating and soaking zones, heavy construction, recuperators for fuel economy, dual gas-oil fuel system, low maintenance cost, and many other advantages. These assure positive, automatic control of furnace output and heating quality.

And the efficiency, economy, ease-of-operation, and trouble-free service this furnace affords are typical of all the furnaces Salem-Brosius builds. Whether you require this or any other heating or heat treating furnace, Salem-Brosius offers equipment designed, engineered, and built not merely as a furnace but as a heating machine. You can purchase these furnaces as complete installations—equipped with all controls, piping and wiring—ready to operate. Write to us.

SALEM-BROSIUS, INC.

PITTSBURGH, PENNSYLVANIA

Salem Engineering Limited, Toronto, Ontario • Salem Engineering Co., Ltd., London & Milford, England • Salem-Brosius, S.A., Luxembourg • Salem-Brosius, S.A., Paris, France • Alloy Manufacturing Corp., Pittsburgh, Pennsylvania • R. H. Freitag Manufacturing Div., Akron, Ohio • General Ionics Corp., Pittsburgh, Pennsylvania.

PERFORMANCE REPORT

R. J. Huff, Granite City maintenance superintendent, points out Morgoil bearings to J. H. Koester, Granite City lubrication engineer, and W. P. "Sandy" Wehking of Standard Oil.

How *STANOIL Industrial Oil* has been delivering on 22-year assignment at Granite City Steel

Bearing assembly viewed from inside by J. H. Koester and Sandy Wehking. Sandy Wehking knows industrial lubrication. For 17 years he's been providing lubrication technical service to industrial customers. He studied chemistry at Blackburn College and has completed the Standard Oil Sales Engineering School.

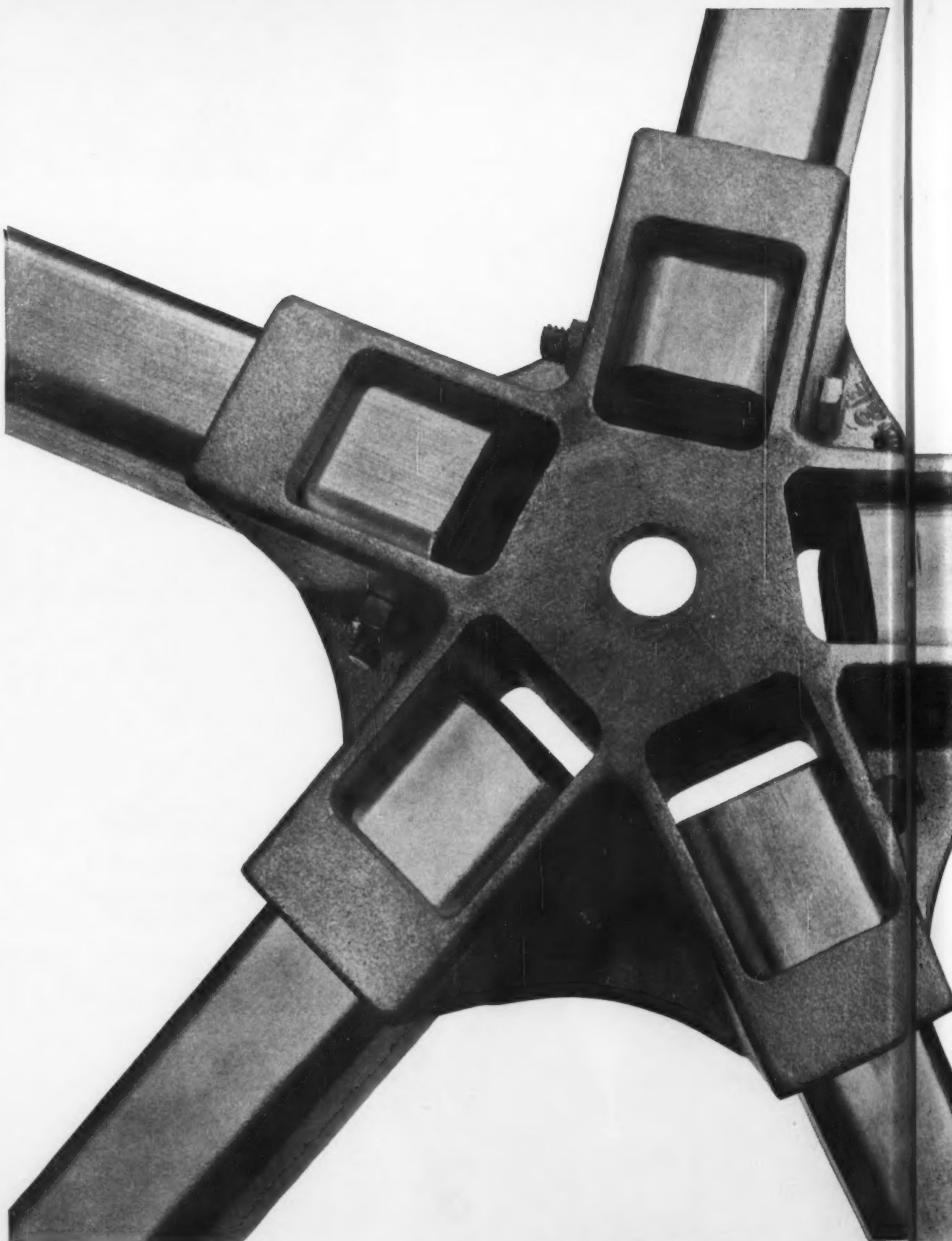
Situation: In 1937, Granite City Steel installed STANOIL Industrial Oil in the Morgoil Back-up Roll Bearings in the five-stand finishing train of their hot strip mill. Each bearing has a load-carrying capacity of more than three million pounds. The oil on which these bearings ride must be of high quality to meet the requirements of this severe service. A narrow viscosity range is required to assure proper operation of the mill throughout the speed range. More than 10,000 gallons of water per minute are used to cool the work rolls. The oil thus must have superior demulsibility to prevent water contamination.

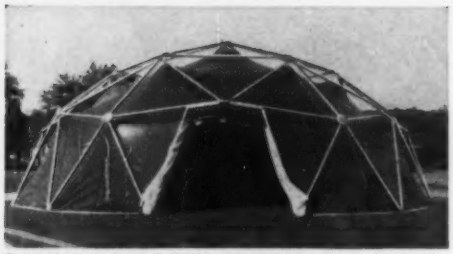
What has happened: Today approximately 1,800 tons rolled is the average shift production. A record of over 2,700 tons rolled has been racked up by one shift in this mill. STANOIL Industrial Oil has continued to deliver top operating performance under these increasingly demanding conditions. Samples of the oil are taken regularly by the Standard Oil lubrication specialist for laboratory analysis to make sure the oil is maintaining specifications. Stocks of STANOIL Industrial Oil are warehoused by Standard at East St. Louis, only twelve miles away, so that the mill has a ready source for the product whenever needed.

What you can do: Get all the facts about STANOIL Industrial Oil from the Standard Oil lubrication specialist near you in any of the 15 Midwest or Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

STANDARD

You expect more from Standard and you get it!





One of the many Q-E-D* geodesic-type dome shelters built for the U. S. Marine Corps by Magnesium Products of Milwaukee, Inc.

The marines go modern . . . quartering themselves and their equipment in portable, simple-to-erect geodesic-type dome shelters like the one shown above. It was designed and engineered by Magnesium Products of Milwaukee, Inc. And strong, lightweight Flynn aluminum extrusions were used to form the framework.

Geodesic shelters—made by Flynn's customer in diameters of 24, 30, 36, 42, AND 57 feet—have to "rough" it. They have to be maneuverable. That's why extruded aluminum is used.

Flynn extrusions form framework for sturdy, mobile Marine Corps shelters

It's tough and long-lasting as well as light and handy to work with. It makes assembly fast and simple. Also, aluminum parts are easy and economical to ship.

Whether your product is for the battlefield or the industrial field, it'll pay you to investigate all the possibilities and advantages of working with Flynn. Flynn has the know-how and experience to turn out quality aluminum parts—in large or small quantities—to your exact specifications. You can order custom styles, or choose from a wide variety of stock profiles and alloys. And you can rely on Flynn for fast, as-promised deliveries.

Write today for ideas relating to your own product . . . free from Flynn of course.

FLYNN
ALUMINUM

MICHAEL FLYNN MANUFACTURING COMPANY
Aluminum Division

Main Office & Plant:
700 EAST GODFREY AVE., PHILADELPHIA 24, PA. ..... Tel.: Fidelity 2-5500

Sales Offices:
51 EAST 42ND STREET, NEW YORK 17, N.Y. ..... Tel.: YUkon 6-6020
937 RADCLIFFE ROAD, TOWSON, MD. ..... Tel.: VAlley 3-2990
672 SOUTH LAFAYETTE PARK PLACE, LOS ANGELES 57, CALIF. .. Tel.: DUnkirk 7-3183
4232 HERSCHEL STREET, DALLAS 19, TEXAS ..... Tel.: LAkeside 6-9757

*Quick-erect dome

SEARING HEAT, FRIGID COLD TORTURE MISSILE BEARINGS

When a rocket fires, each component must *be* right, *work* right, the *first* time—and operating conditions are extreme! For example, liquid oxygen sends bearing temperatures plunging to hundreds of degrees below zero . . . while engine heat roasts bearings at a near-thousand degrees. Elsewhere, incredibly precise systems move surely on bearings with millionths-of-an-inch tolerances. In these critical applications you'll find Bower Roller Bearings!

On the ground, Bower Roller Bearings keep trucks, equipment and gantries rolling under the heavy loads essential to the missile's launching.

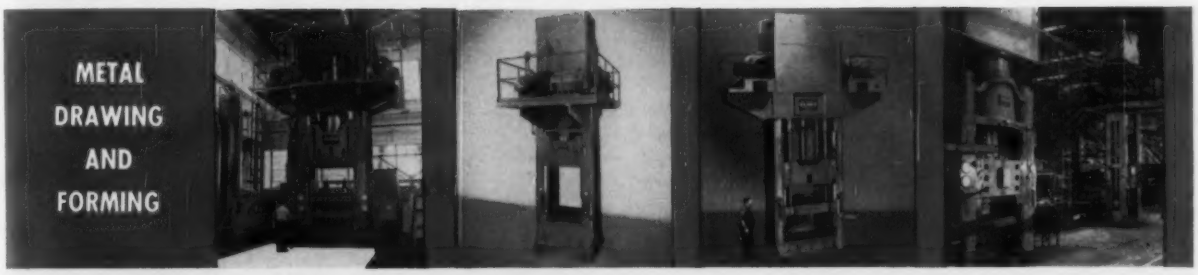
Bower, a major supplier of bearings for missiles and aircraft, also serves many other industries—automotive, construction machinery, machine tool and farm equipment, to name a few. You'll find bearings for most every field in Bower's full line of tapered, cylindrical and journal roller bearings.

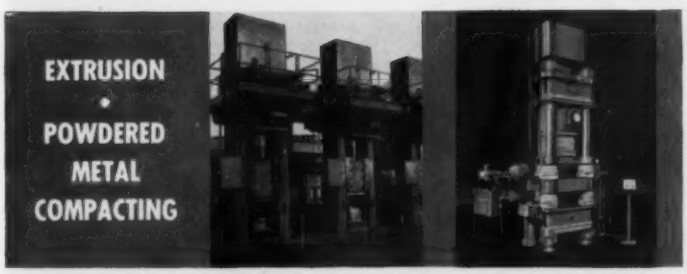
BOWER ROLLER BEARINGS

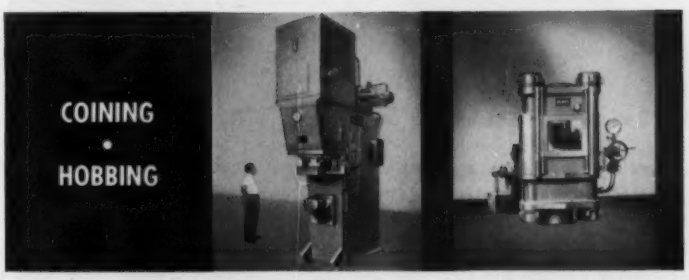
Bower Roller Bearing Division • Federal-Mogul-Bower Bearings, Inc. • Detroit 14, Michigan

For YOU, too . . .

Elmes can turn pressing problems into profit-making performance!







Elmes Engineering vision and know-how have provided hundreds of cost-reducing press installations like these during more than 60 years of leadership in specialized hydraulic service.

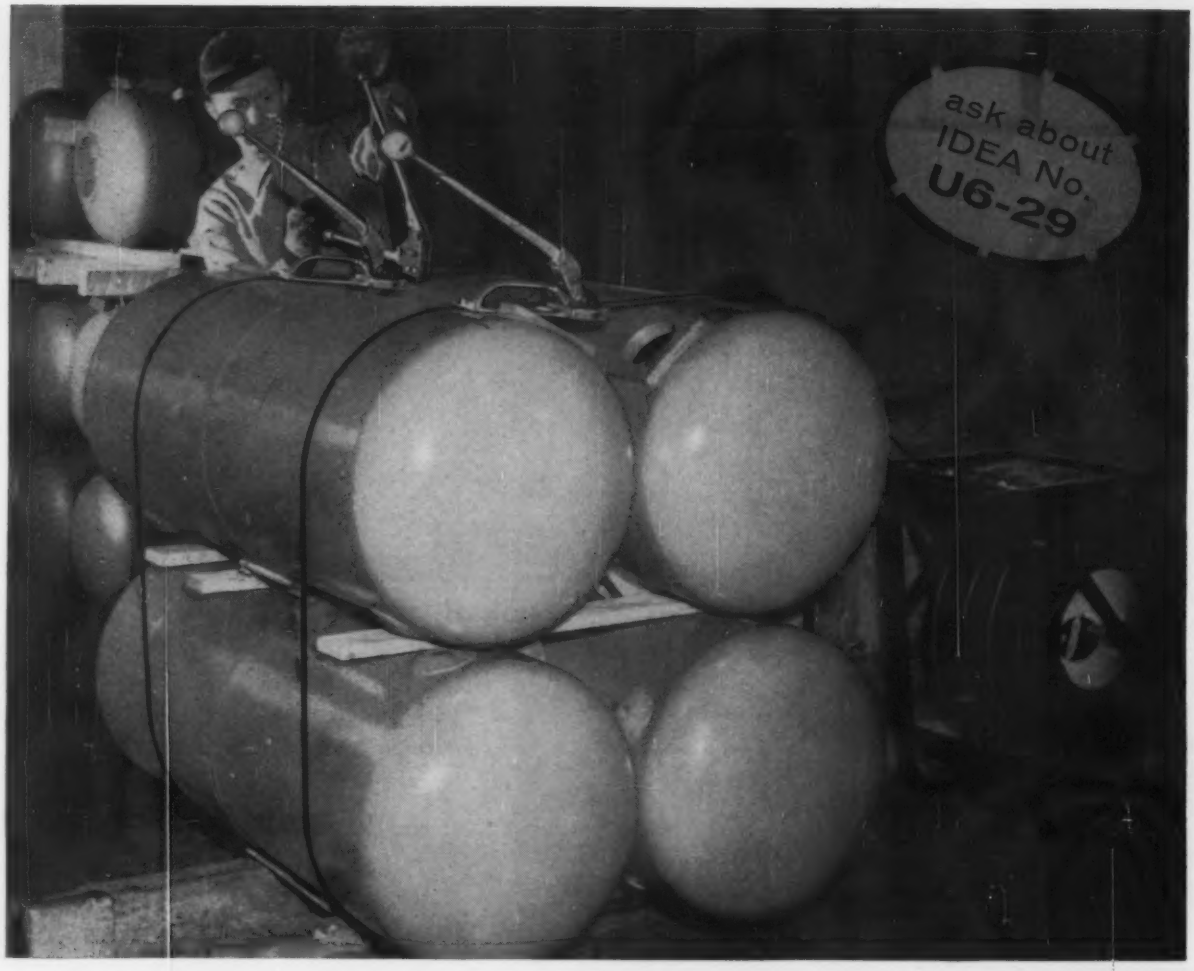
In some cases, a standard-design Elmes® Press met all the job needs. In others, simple modifications were made in the basic press design. In still others, a special "custom built" press was developed to meet unusual production requirements. But in every case the press was Elmes "Job-Fitted"—*the right press for the job.*

Elmes experience and ingenuity can bring the same profit-producing transformation into your shop. Talk it over with your Elmes Distributor, or write us direct.

Elmes American Steel Foundries
ENGINEERING DIVISION

1166 Tennessee Avenue, Cincinnati 29, Ohio

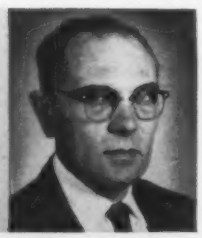
METAL-WORKING PRESSES • PLASTICS MOLDING PRESSES • PUMPS • ACCUMULATORS



Use your AIM*... Pressed Steel Tank Co. does...

Unitizing reduces tank damage 75%

PRESSED STEEL TANK COMPANY, MILWAUKEE, WISCONSIN, cut damage claims 75% by using heavy-duty Acme Steel Strapping to unitize steel tanks. Working with their Acme Idea Man, a system was developed to strap tanks in units of four for fast handling and safe shipment. (Idea U6-29)

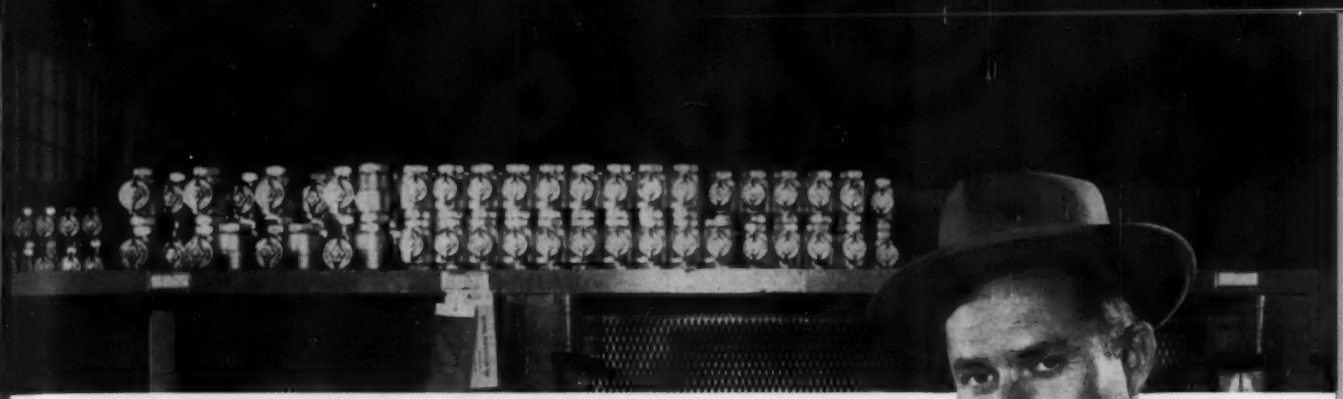


Acme Idea Man E. O. Schroeder worked with Pressed Steel Tank Company to devise unitizing methods.

Unitizing protects tank finish and prevents damage to exterior fittings. Tanks are held securely in position during shipment. This unitizing method also increases plant efficiency: although a strapping crew has been added, overall handling costs are less. Now the unitized tanks are handled entirely with mechanical equipment. Inventory control is simplified and storage space is more efficiently utilized. Customers appreciate improved arrival condition, too!

***Use your Acme Idea Man.** Problem solving in product handling and shipping is his business. Call him at the nearest Acme Steel office. Or write Dept. IFU-119. Acme Steel Products Division, Acme Steel Company, Chicago 27, Illinois. In Canada, Acme Steel Company of Canada, Ltd., 743 Warden Ave., Toronto 13, Ontario.

ACME STEEL **STEEL STRAPPING**



"Buy the best... your supplier has it"

ACF lubricated Plug Valves are available in rectangular, round, diamond and V ports; venturi, multiport and steam-jacketed models.

Materials: steel, semi-steel, Ni-resist, carbon steel, bronze, aluminum.

Sizes: ½" through 30".

Working Pressures: 125 through 800 pounds.

acf®
Lubricated Plug Valves

You'll get top performance from ACF valves. They seal tight, service quickly and fit into the smallest possible space.

Both rectangular and round port valves provide through-conduit flow with minimum turbulence, minimum pressure drop. The cylindrical plug can't stick or wedge — operates with an easy quarter-turn.

Next time — and every time — ask for ACF! *Available from leading suppliers everywhere.*

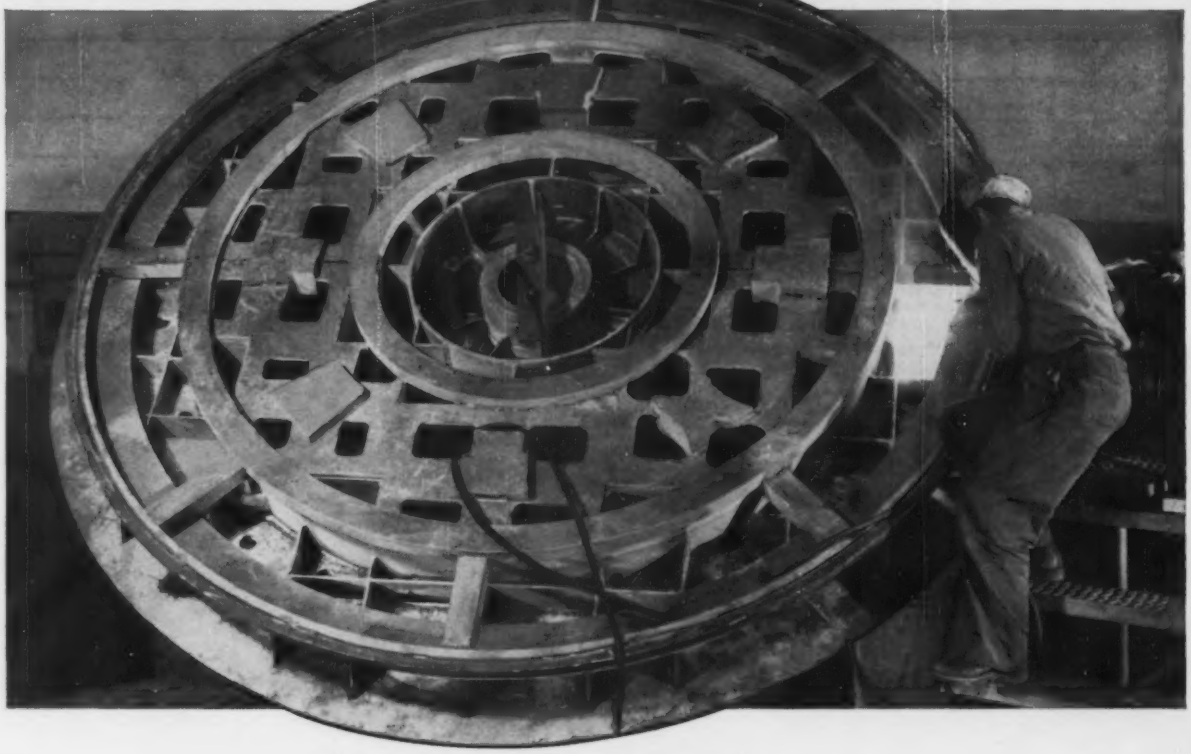
WRITE FOR CATALOG 400

W-K-M

DIVISION OF acf INDUSTRIES
INCORPORATED
P. O. BOX 2117, HOUSTON, TEXAS

5918

STEEL-WELD FABRICATION . . .



PRECISION WELDMENTS

Fabricated and Machined to Specification!

The intricate weldment above, which is one of several components of a radar antenna's base mechanism, is typical of thousands of Steel-Weld Fabricated parts and assemblies produced and machined by Mahon for defense contractors, manufacturers of processing machinery, machine tools and other types of heavy mechanical equipment.

When your design calls for weldments of any kind, you, too, will want to discuss your requirements with Mahon engineers; because, in the Mahon Company you will find a unique source for weldments or welded steel in any form . . . a fully responsible source with a long and enviable performance record, and unusual facilities for design engineering, fabricating, machining and assembling.

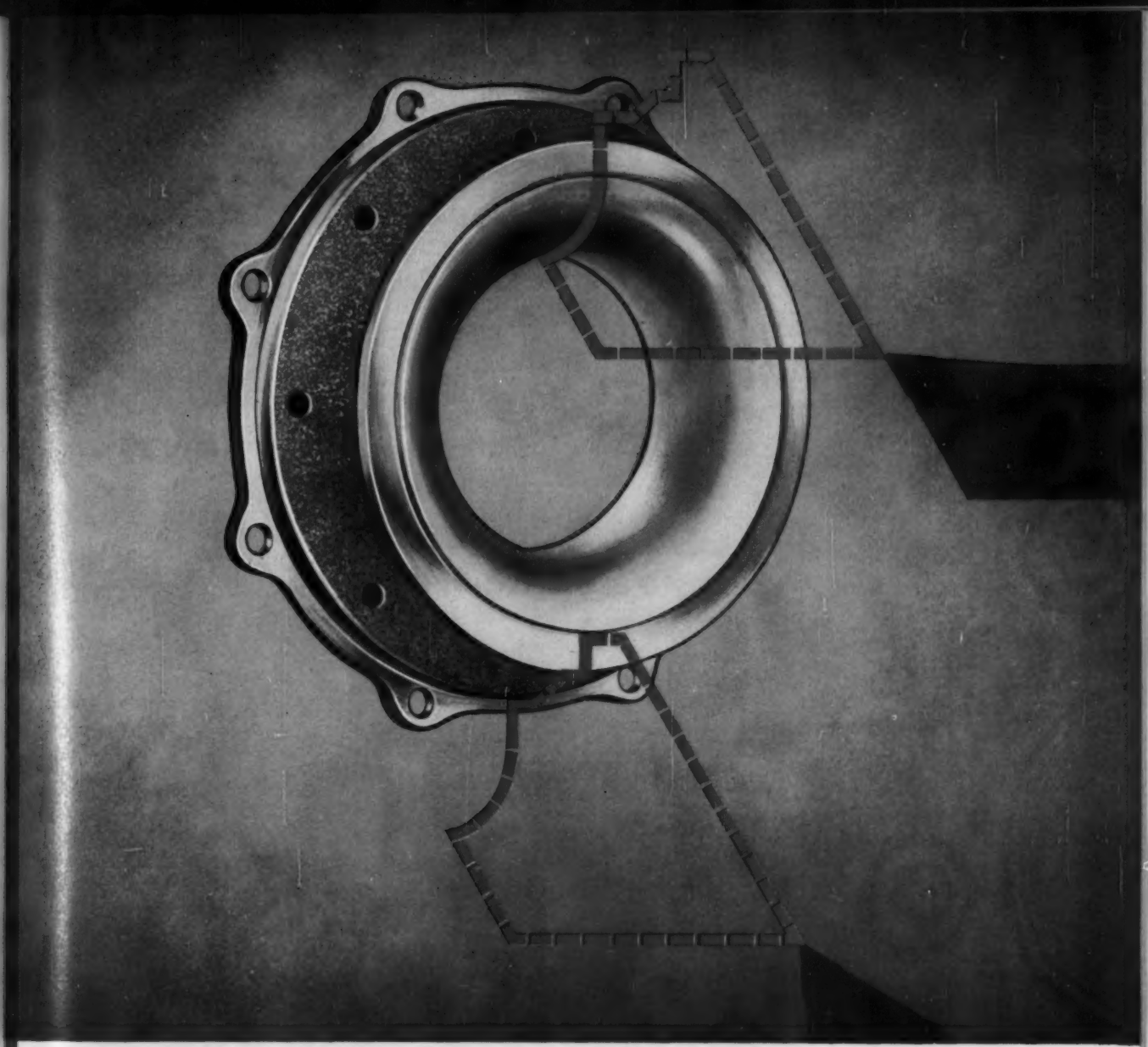
See Sweet's Product Design File for information on Facilities, or have a Mahon sales engineer call at your convenience.

Use WELDED STEEL for 100% Predictability and Greater Strength with Reduced Weight!

THE R. C. MAHON COMPANY • Detroit 34, Michigan

SALES-ENGINEERING OFFICES in DETROIT, NEW YORK, CHICAGO, LOS ANGELES and SAN FRANCISCO

MAHON



seven *surfaces to turn:* **one** *template,* **one** *slide,* **two** *tools.*

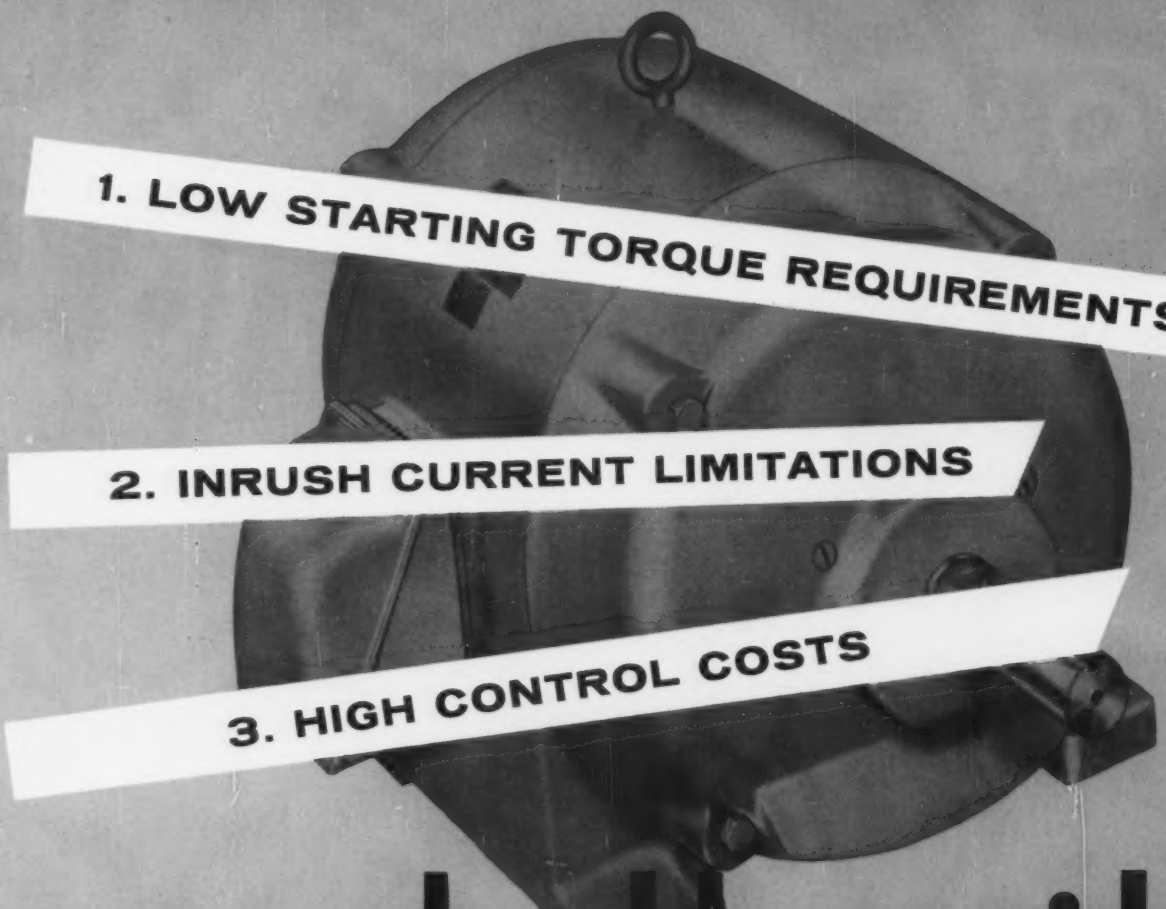
Machine tools are rarely if ever bought because somebody thinks they might come in handy. They are bought because a specific job needs to be done and because a particular machine is judged best fitted to do it. However, no matter how specific your need may be, *versatility* is the greatest by-product you can buy, and the greatest assurance of a profitable investment.

Perhaps your problem is economical, long-run production of a contoured shaft piece. Well and good: your best bet is a New Britain +GF+ copying lathe. Now let's suppose you develop a requirement for only a few hundred pieces like the one illustrated. Your New Britain +GF+ is every bit as efficient. Simple tooling; fast setup; rapid, accurate production.

The applications for contour turning are very broad. If you have contour turning, boring and facing work on shafts or chucking work, you should be interested in the New Britain +GF+. Many shops whose production requirements wouldn't justify very expensive, lightning-fast production can make highly profitable use of one of the basic models because of its versatility, accuracy, fast setup and inexpensive tooling. At the other end of the scale,

you can't touch our machines for tremendous volume work. Obviously, this subject is much too broad and too important to do justice to it here. We would like to send you literature that spells things out in much more detail. New Britain-Gridley Machine Division, The New Britain Machine Company, New Britain, Connecticut.

If you have this type of motor problem:



1. LOW STARTING TORQUE REQUIREMENTS

2. INRUSH CURRENT LIMITATIONS

3. HIGH CONTROL COSTS

you should consider

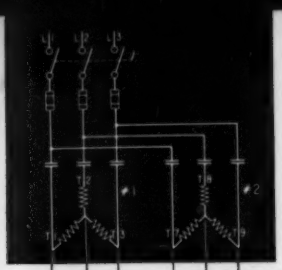
Why part-winding start? It's a question of large inrush current problems caused by *across-the-line starting* of motors that are getting bigger and bigger. Industry is concerned about the resulting voltage dips causing equipment to malfunction. Power companies are concerned about the attendant line-voltage fluctuations. And just as important, no resistors or auto-transformers are needed, making it the most economical of reduced KVA starting methods.

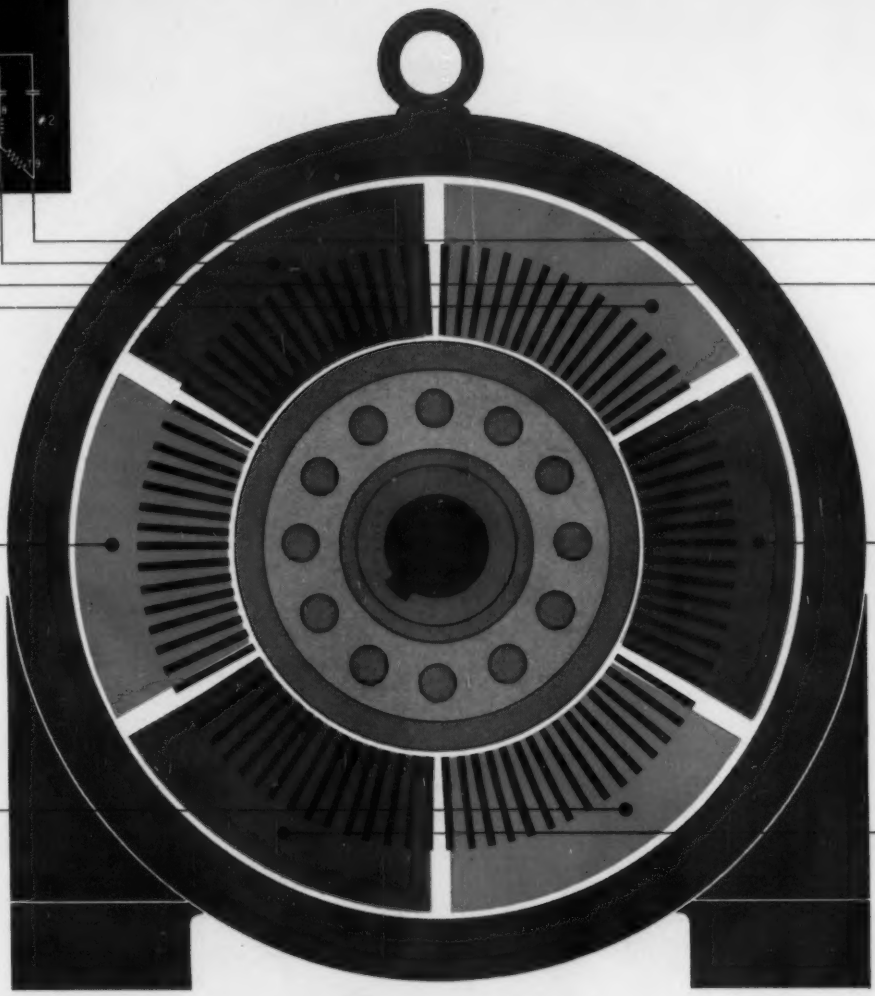
Why A. O. Smith? The answer is a scheme for part-winding start employing a *balanced,* two-section stator sequence. This allows the motor to be started at only three to four times the normal full-load running current — one set of stator windings usually brings motor up to running rpm in two to five seconds. Then, without breaking the circuit, the second set of windings cuts in smoothly and efficiently with minimum line disturbance.

A. O. Smith's balanced start minimizes vibration and noise caused by unbalanced magnetic fields — a situation that often develops on conventionally wound motors. Electrically and mechanically balanced, A. O. Smith's PWS motor is quieter, smoother, longer lasting. A. O. Smith PWS vertical and horizontal motors are available from 15 hp to 150 hp.

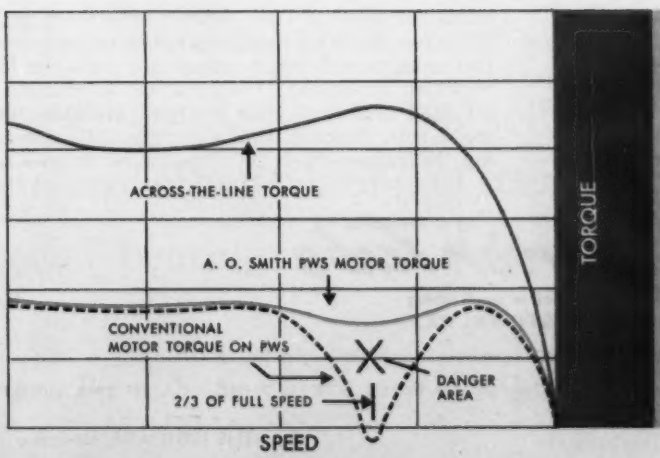
Perhaps you have an application for this type motor. Why not let A. O. Smith's skill and experience in this particular field assist you? Write today for detailed information.

A. O. Smith offers a full line of motors—1/3 to 800 hp





part-winding start



Through research ... a better way

A.O.Smith
CORPORATION

ELECTRIC MOTORS
531 N. Fourth St.
Tipp City, Ohio

A. O. Smith INTERNATIONAL S. A. — Milwaukee 1, Wisconsin, U. S. A.

Tubexperience in action

New High-Strength Material Extends Superior Line of Stainless Steel Tubing Analyses

PH 15-7 Mo, a new precipitation-hardening stainless steel analysis, possesses excellent mechanical properties at room temperature, outstanding ones at elevated temperatures. In addition, it is readily fabricated in the annealed condition, exhibits good corrosion resistance characteristics, can be hardened by heat treatment with minimum distortion.

Tubing of this new analysis is recommended for aircraft structural parts, studs and bushings, Bourdon springs and torque tubes in instrumentation, tubular springs, and hydraulic lines where severe bending and forming are required. It is available in WELDRAWN® form in size range from .012 through 1.125 in. OD.

In addition to PH 15-7 Mo, Superior offers the widest variety of analyses in the small-diameter tubing industry—over 120. This range permits you to specify the right one for your particular application. For complete information about PH 15-7 Mo and other analyses available for your needs, write Superior Tube Company, 2004 Germantown Ave., Norristown, Pa.

*Reg. U.S. Pat. Off., Armco Steel Corp.

Superior Tube

The big name in small tubing

NORRISTOWN, PA.

All analyses .010 in. to ⅜ in. OD—certain analyses in light walls up to 2½ in. OD

West Coast: Pacific Tube Company, Los Angeles, California • FIRST STEEL TUBE MILL IN THE WEST

This is a new HiLube® sintered bronze bearing. It is treated with moly sulfide, is self-lubricating, and holds almost a third more oil than other sintered bronze bearings. It runs cool and quiet at high speeds. It will last far longer than any other bearing of its kind. HiLube is one of many special bearing materials developed by Bound Brook.

BOUND BROOK

Bound Brook Oil-less Bearing Co., Bound Brook, N. J.
Pioneer in Powder Metallurgy Bearings and Parts.
Plants at Bound Brook, N.J. and Sturgis, Mich.

NATIONAL ACME'S
"ZONE OF RESPONSIBILITY"
INCLUDES ALL PHASES
OF COST REDUCTION

Check YOURS...Then Check National Acme

Direct Costs: these include direct dollar savings as realized by Minneapolis Honeywell . . . an "every day" job for Acme-Gridleys.

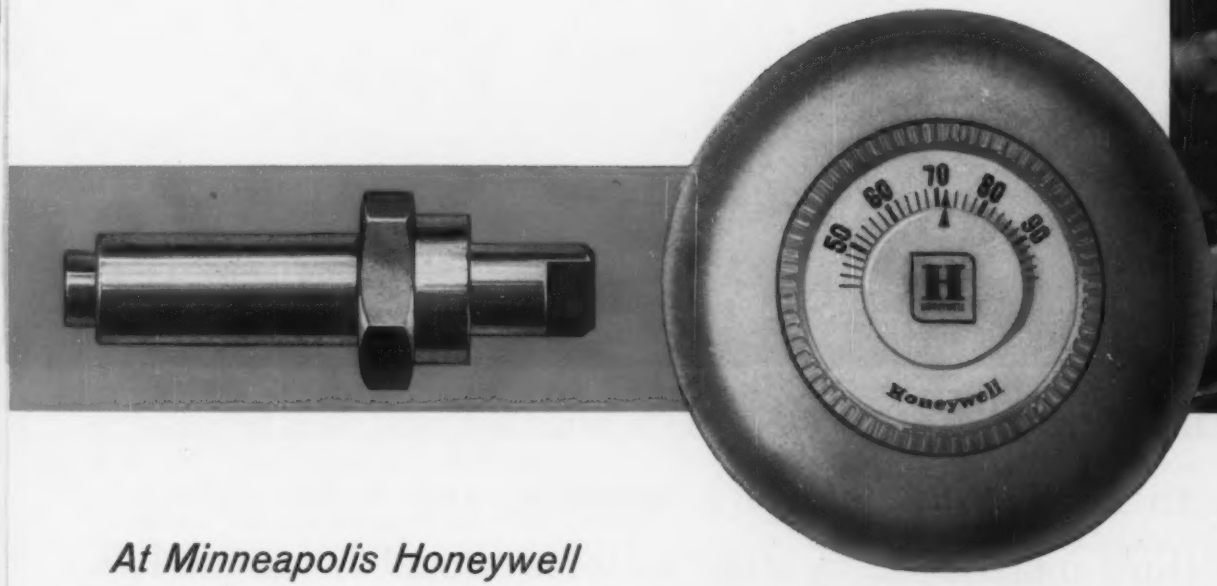
Indirect Costs: effecting important savings in maintenance, downtime, scrap reduction, tool costs, etc.

Product Redesign: teaming with your design group to take full advantage of Acme-Gridleys' cost reducing capabilities.

Direct Material Costs: our engineers provide important savings in this area by constantly matching machines and tools to modern metallurgical problems.

Make-or-Buy Reviews: in many cases our Contract Division can assume your production headaches and relieve you of immediate capital investment.

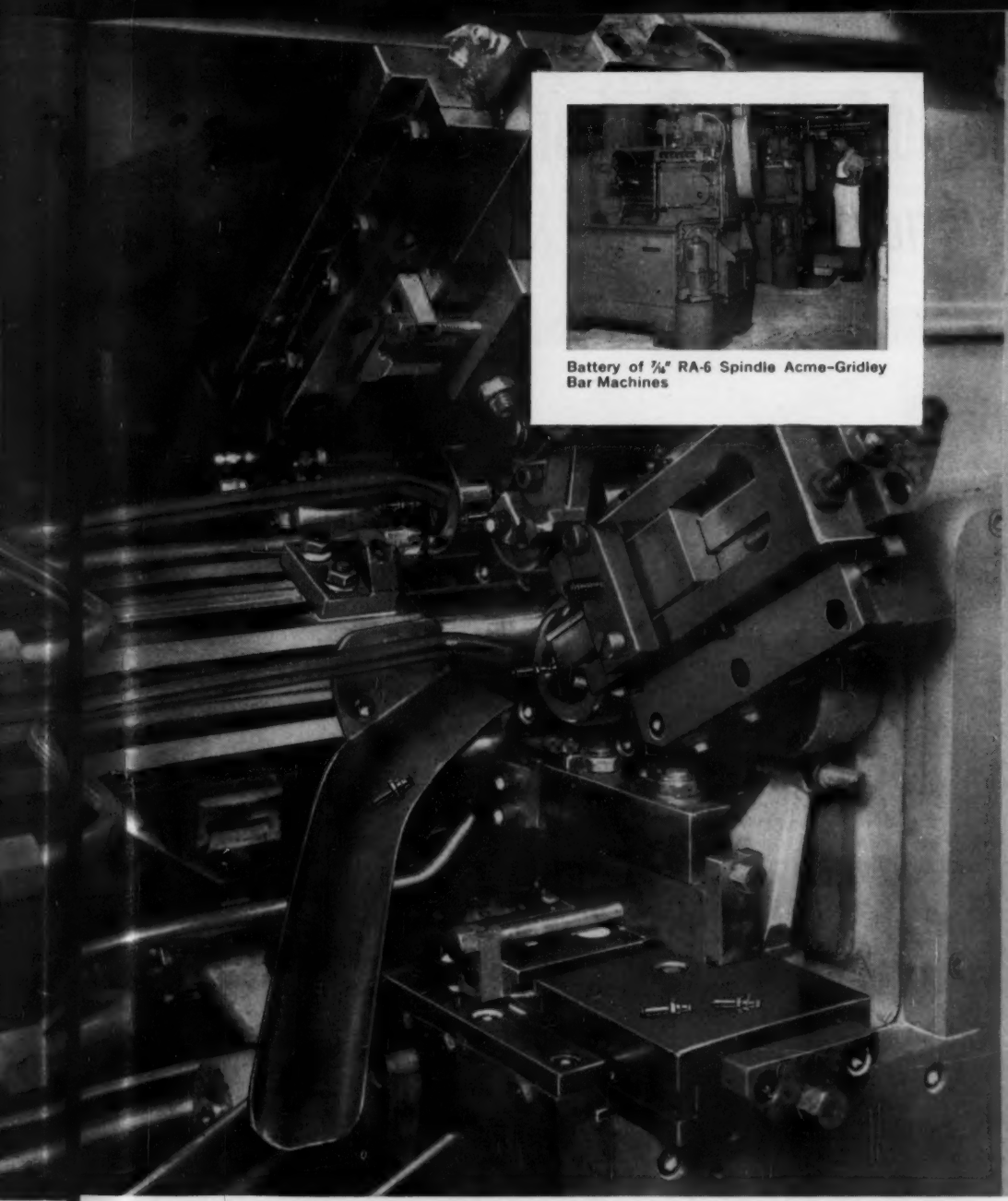
Spot Modernization: pioneering in modern tooling methods, and the flexibility of Acme-Gridleys can provide many "on-the-spot" savings.



At Minneapolis Honeywell

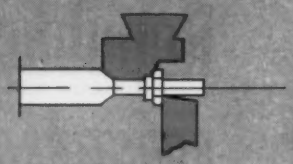
ONE ACME-GRIDLEY REPLACES FIVE SINGLE SPINDLE MACHINES

. . . Saves 200% in Machine Hours

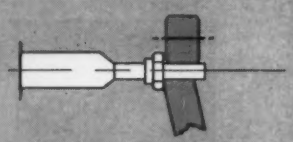


Battery of ⅞" RA-6 Spindle Acme-Gridley Bar Machines

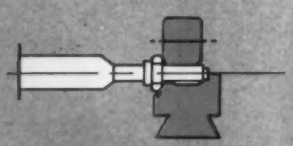
7 Operations in 2.75 Seconds



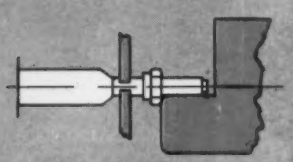
6. Form Rear—
Rough Turn—Front Dia.



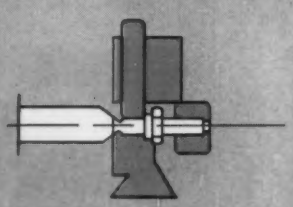
1. Finish Turn Front Dia.



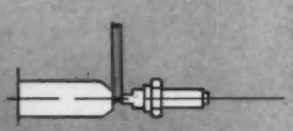
2. Form Small Dia.
and Face End—Support



3. Stop Spindle—
Cross Mill Flats—Support



4. Start Spindle—Shave Rear Dia.



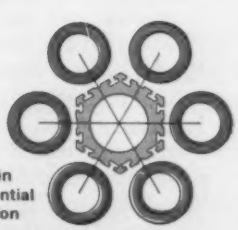
5. Cut off

Close up of tooling zone showing 3rd, 4th and 5th position operations

. . . *in addition* the reject rate is reduced 200% and operator hours slashed 300% in the production of a precision center post component for residential thermostats. What's more, with one machine, one set of tools, and one operator doing all machining in the primary setup, quality control is greatly simplified, and valuable floor space saved. Still further savings result from greatly reduced machine maintenance.

Such drastic savings are possible for Minneapolis Honeywell because of inherent Acme-Gridley features such as independently operated tool slides, the extreme accuracy and flexibility of direct camming, and wide open tooling zones. Rugged and versatile 7/16" Acme-Gridleys fit right in with Honeywell's program of "Total Machine Utilization"; will pay off for years to come by economically accommodating the materials and setups Honeywell requires in the production of small, high quality parts for their precision instruments.

Get the complete story on how Acme-Gridley Automatics provide industry's most modern approach to cost reduction. Call, write or wire.



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Republic Cold Drawn Carbon Corrected Bars

BOOST PRODUCTION, IMPROVE QUALITY, MINIMIZE REJECTS

Note the result of induction hardening in the cutaway view at left of a piston pin fabricated from Republic C-1050 Cold Drawn Carbon Corrected and Annealed Bars.

A piston pin manufacturer was experiencing production difficulties and dissatisfaction with pin quality from a performance standpoint.

A Republic 3-Dimension Metallurgical Service Team was invited to work on the problem. A field metallurgist visited the plant. He talked to production men and engineers. Found out what they expected the steel to do. He then reported back to the mill and laboratory metallurgists. The three men discussed the problem, pooling their combined knowledge of steels and machining.

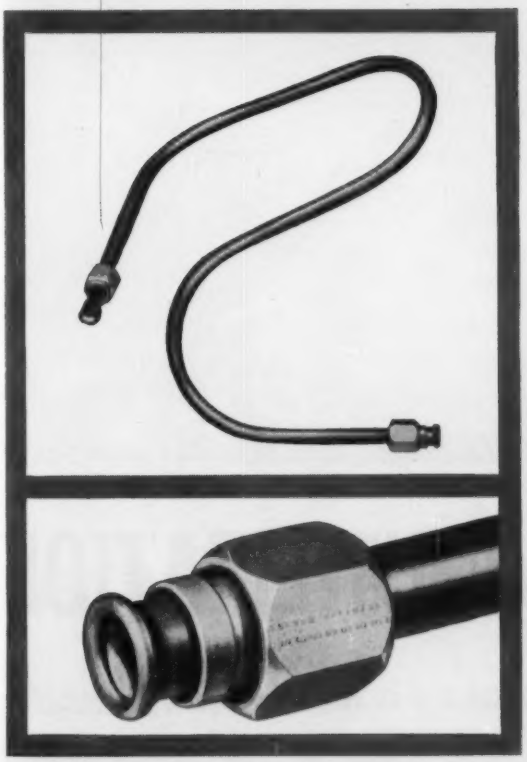
Their final recommendation was a switch from plain cold drawn bars to Republic C-1050 Cold Drawn Carbon Corrected and Annealed Bars. The results were immediate. Production increased substantially. Pin quality improved to the highest level.

The company is also enjoying better machinability and is saving both metal and money by eliminating waste. Carbon Corrected Bars eliminate the extra preparation of machining or grinding away bar surface to remove "decarb." The Carbon Correction Process also eliminates the need for buying bars oversize to allow for decarb removal to depths of 20 thousandths of an inch or more.

Republic Cold Drawn Carbon Corrected Bars are ideally suited for your steel parts requiring high surface hardness —particularly those produced by induction heating.

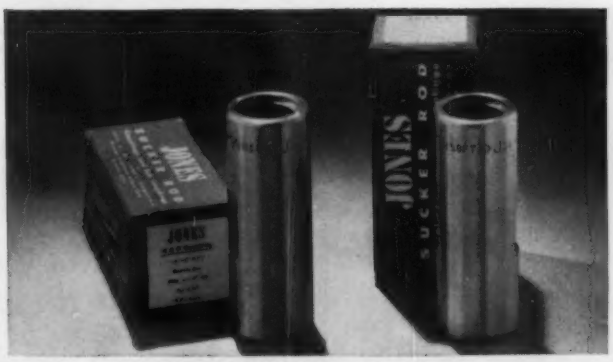
For more information on Republic Cold Drawn Carbon Corrected Bars, or obligation-free 3-D Metallurgical Service, mail the coupon.

GRADER BLADE MANUFACTURER LEVELS OFF COSTS WITH REPUBLIC HOT ROLLED SPECIAL BAR SECTIONS. Shunk Manufacturing Company, Bucyrus, Ohio, has maintained top-quality and its competitive position for over 30 years by using Republic High Carbon Hot Rolled Special Bar Sections for grader blades. The special bar sections are preformed to the predominating cross section of the blade, thus keeping costs down by eliminating most machining and forming operations. Republic Special Bar Sections are available hot rolled or cold drawn in carbon, alloy, and stainless steel. Send coupon for full facts.



YOU GET MORE TUBE PER DOLLAR with Republic ELECTRUNITE® Hydraulic Fluid Line Tubing. Available in all sizes shown in JIC Standards Book. Available in an even wider range of sizes produced to our specification HL-1 (which meets all test requirements of JIC standards). Utmost uniformity assures better bending and flaring characteristics, appreciable savings in downtime. In the *history* of ELECTRUNITE Hydraulic Fluid Line Tubing, no failure resulting from longitudinal or transverse cracks has been reported. Send for complete ELECTRUNITE information, including a copy of specifications.

REPUBLIC COLD FINISHED ALLOY STEEL BARS PROVIDE GREAT STRENGTH, PRECISE TOLERANCE at reasonable cost in the production of sucker rod couplings. The parts must withstand enormous static and dynamic loads, to more than 40,000 psi. Essential to designing smaller sections to carry heavier loads safely is the outstanding combination of qualities provided by alloy steels. Then add the advantages of the cold finishing process . . . you have a material that offers strength, hardness, machinability, size and close-sectional accuracy, smooth bright surface, and close tolerance straightness. Mail coupon for more information.



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☐ ELECTRUNITE Hydraulic Line Tubing
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Company_____

Address_____

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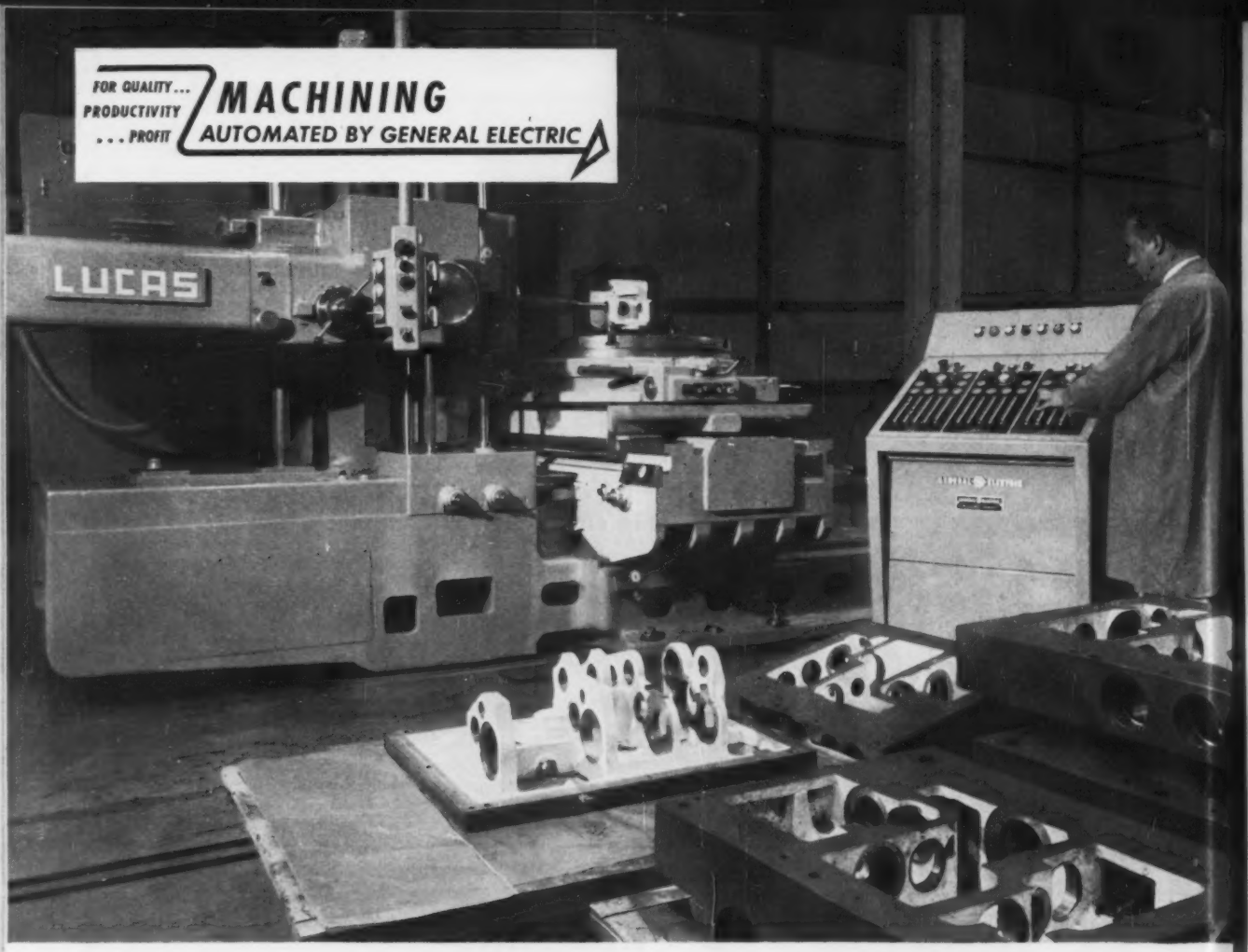
FOR QUALITY... PRODUCTIVITY ...PROFIT
MACHINING
AUTOMATED BY GENERAL ELECTRIC



INCREASE MACHINE UTILIZATION

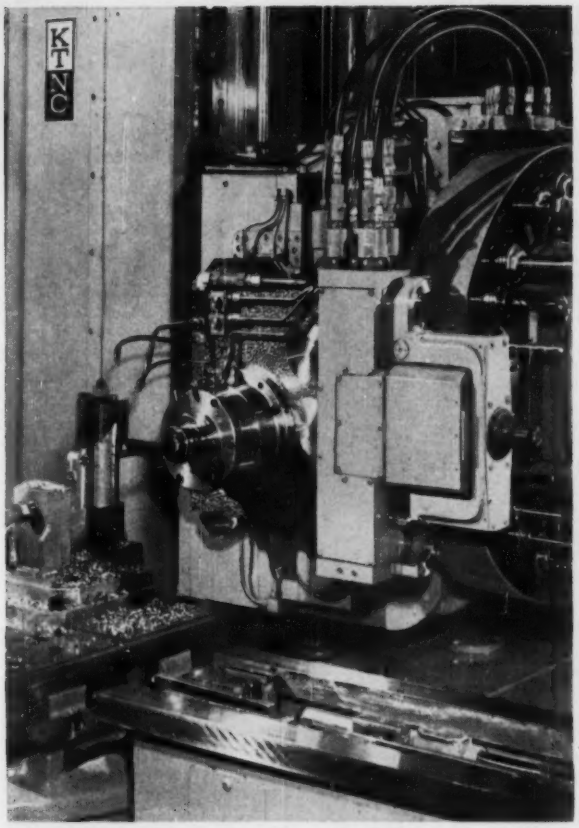
MARK SERIES NUMERICAL CONTROLS...

....standard, job-proved packages now in use on a wide variety of machines

General Electric's Mark series of standard, pre-engineered numerical control packages—with systems for controlling 1 to 5 motions plus machine auxiliary functions — are compiling impressive performance records on scores of machines throughout American industry today.

Machine operation is completely automatic—from punched tape prepared on a standard automatic typewriter. If desired, semi-automatic positioning, useful for prototype work, is obtained with manually set dials on the control station.

Key components of a typical Mark package are a controller, a punched tape reader, operator's control station, servo drives and position-sensing units.



ONLY ONE SETUP NEEDED to produce even highly complex parts on this G-E controlled multi-purpose milling, boring and drilling machine means dramatic savings. And, tooling savings on one group of 6 parts totaled $10,000.

83% LEAD-TIME REDUCTION is average for parts produced on this 6-spindle turret drill directed by G-E numerical control. Tooling costs are 40% of former methods. Tape data-storage saves expensive tooling space.

with General Electric numerical control

Move quickly from part to part, cut non-productive machine time

An idle machine . . . and an investment going to waste! This is the case in plants throughout metalworking today—perhaps including yours!

Many reasons are apparent: tool-room lag in making fixtures; long setups during changeover; excessive manual positioning; or, poor machine scheduling due to manual operation. Whatever the case, this adds up to something you cannot afford: high unit costs.

But, there is a solution! General Electric numerical control on today's modern machines provides increased machine utilization that signals the end of long lead times . . . multiple setups . . . long machining cycles . . . and, excessive in-process inventories.

Reports prove the advantages of G-E numerical controls. One user states that with G-E controls, his milling, boring and drilling machine is making chips 55% more of the time . . . setup time is cut 40% . . . and positioning time is 50% less. All this—plus a major reduction in parts inventories made possible by G-E tape control's ability to exactly reproduce a part at any future time—enabled this user to pay for his numerically controlled machine in less than two years.

In another case, a new multi-purpose milling machine—directed by G-E numerical control—selects 31 different tools automatically. Non-productive machine-cycle time is virtually eliminated, and complete part machining is possible on a *single* setup. On one small-lot part, 749 hours were saved. Tooling savings on a group of 6 different parts totaled over $10,000.

Join with these and hundreds of users who are increasing machine utilization and worker productivity, and eliminating special tooling cost with G-E numerical control. See your G-E Apparatus Sales Engineer or machinery builder today. General Electric Co., Specialty Control Dept., Waynesboro, Va. 795-8

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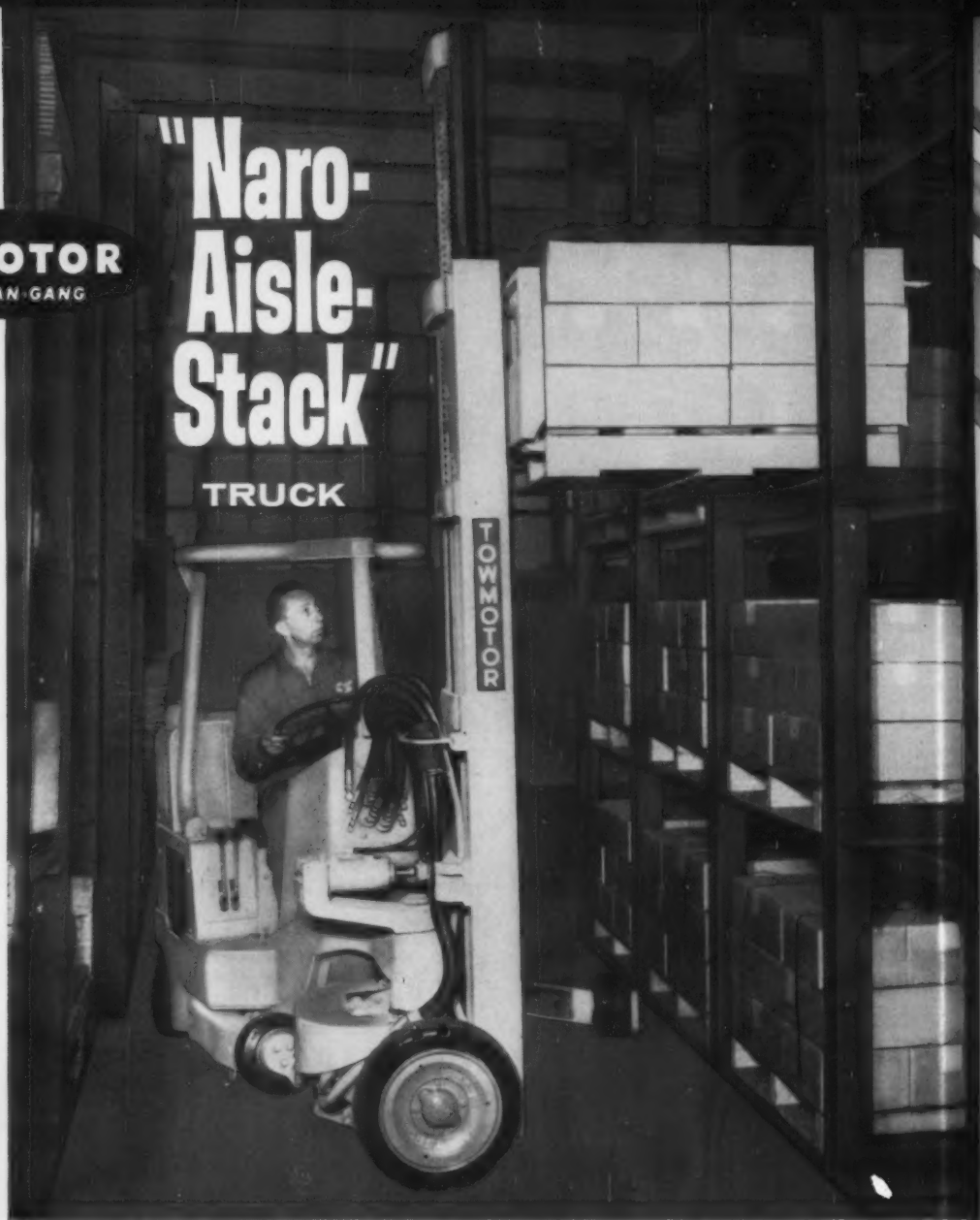
TOWMOTOR
THE ONE-MAN GANG

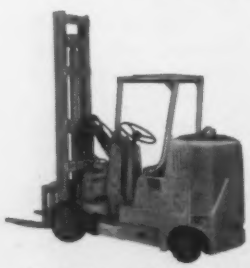
"Naro-Aisle-Stack" TRUCK



Increases storage capacity up to 35% . . . gives you an "extra warehouse" free

Stacks either side in 6-foot aisles...

Newest idea in fork lift trucks!



...also performs like standard lift trucks

The "Naro-Aisle-Stack" series is a Towmotor "first" that offers an entirely new mass handling technique in fork lift truck operation.

Equipped with hydraulically operated outriggers, Towmotor "Naro-Aisle-Stack" trucks perform right and left angle stacking in aisles 6 feet wide, or from four to six feet narrower than lift trucks usually require.

In addition, they also perform all of the functions of a regular fork lift truck. They pick up and lift heavy loads at speeds of 70 feet per minute. Their built-in maneuverability and pivot-action make it possible to operate in congested storage areas and turn sharp corners with the agility, safety and comfort only a sit-down type truck offers.

The new Towmotor "Naro-Aisle-Stack" truck is made possible only by the use of the exclusive Towmotor Towmostatic Drive — the drive that eliminates the clutch, the transmission, the drive line, the differential and all shifting mechanism. It's a brand new idea in fast, efficient materials handling.

For complete information, write Towmotor Corporation, Cleveland 10, Ohio, and ask for folder No. F-37.

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THE ONE-MAN GANG
-GERLINGER

LEADERS FOR 40 YEARS IN BUILDING FORK LIFT TRUCKS, CARRIERS AND TRACTORS

Gerlinger Carrier Co. is a subsidiary of Towmotor Corporation

AMAZING McKAY RADII*

drastically reduces profiling costs!

STANDARD RADII*

AUTOMATIC RADII*

Precision profile milling can now be accomplished in seconds with unskilled labor.

The amazing new McKay Radii will cut either simple radii or irregular shapes with no set-up or layout. The operator simply slips the material to be profiled into a simple vise and moves a handle through a 180 degree arc.

Available in either manual or pushbutton automatic models the Radii is modestly priced and requires less than 10 square feet of floor space and only standard shop electrical and air facilities.

For literature or further information on this outstanding cost-cutter write *McKay Machine Company, Youngstown 1, Ohio.*

*Radii is a trademark of the McKay Machine Co.

McKAY McK MACHINE

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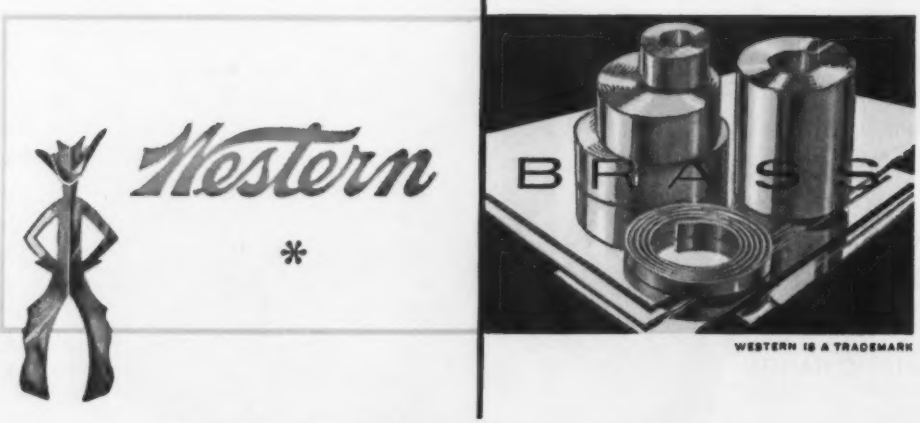
...especially Western Brass...
has done...is doing...
and will do...many jobs better than
any other metal. Western Brass
is "tailor-made" for
each job.



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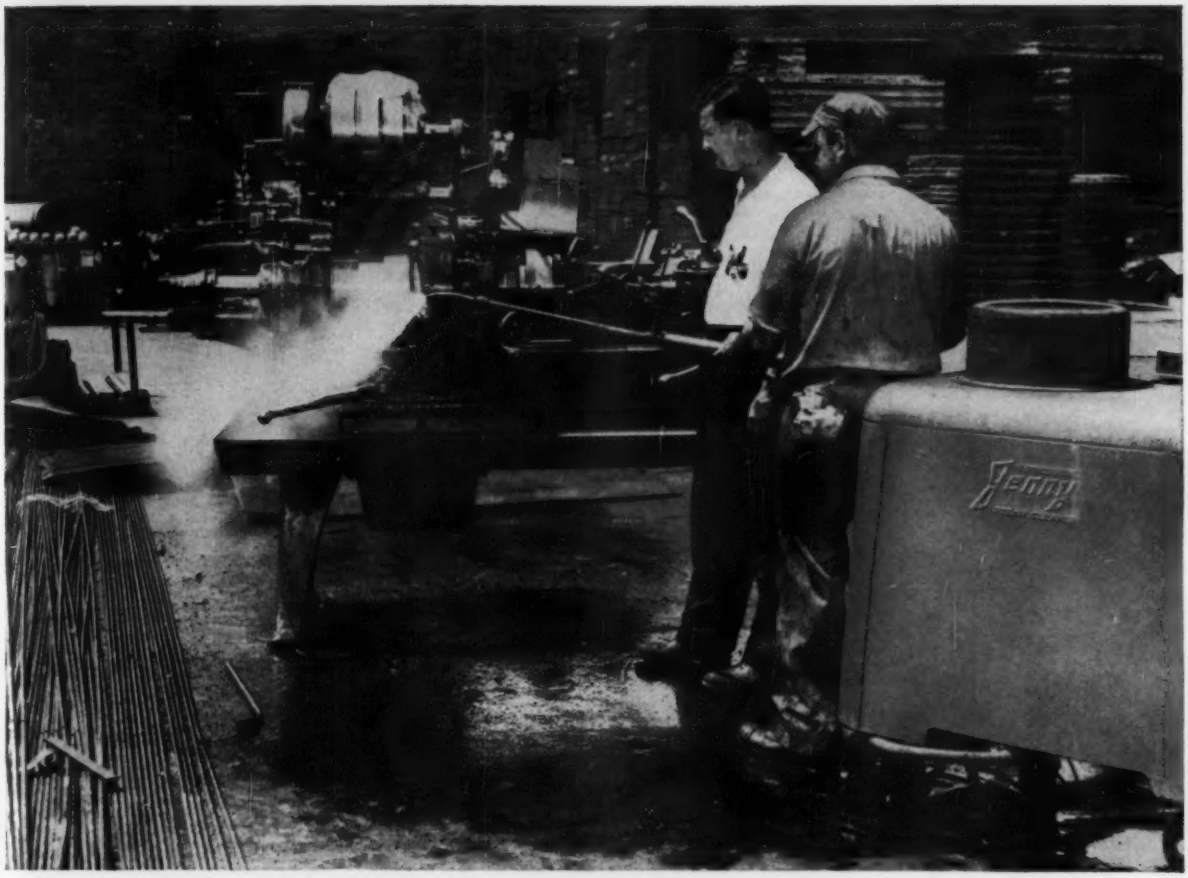

Jenny® Removes 25 Years of Grime– Slashes Tool Reconditioning Time!

To remove 25 years' accumulation of dirt, grime, and grease from 200 metal working and forming tools, was the problem faced by Mr. John Radzak, Production Manager, Universal Form Clamp Co., Chicago. After trying numerous methods, Hypressure Jenny Steam Cleaner was chosen as the most thorough and economical means of doing the job.

Typical of Jenny's speed and savings was the fact that it cleaned a 100-ton punch press in six hours, as compared with 10 man-days required previously by hand-cleaning methods.

Now, Jenny is used in the company's plant housekeeping program, and it has helped to establish them as one of the cleanest and safest plants in the country.

It will pay you well in profits, production and worker morale to make Jenny the keystone of *your* maintenance and reconditioning programs. With a choice from more than 50 different models of Jenny, including all-electric, oil-fired, or gas-fired types, and ranging in capacity from 35 to 360 gallons per hour, you are sure to get the best Jenny for your cleaning jobs.

Mail the coupon today for additional facts or free demonstration. You'll be glad you did!

23

☐ Please arrange to demonstrate a Jenny.

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HOMESTEAD VALVE MANUFACTURING COMPANY

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JONES & LAMSON "AUTOMATION"

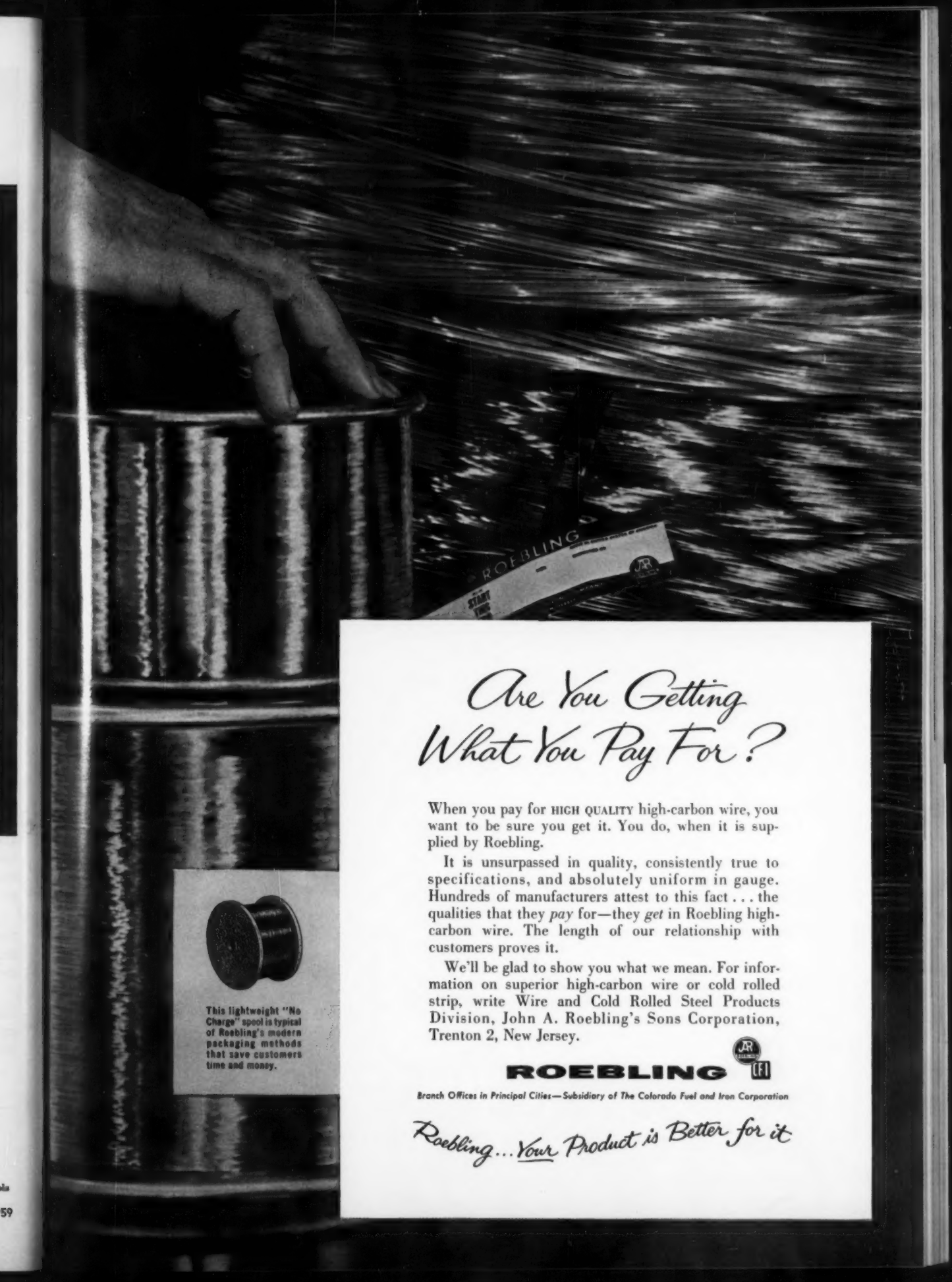
the man who needs a new machine tool is already paying for it

Numerical Control . . . what's it worth?

What *about* numerical control: is it all it's cracked up to be? The answer, in a word, is "yes". Here's why. With numerical control, the *big* factor is *flexibility*. Tape or numerical programming can be employed economically for medium or small lot production, even down to *single pieces*. Accuracy is also increased. For instance, Jones and Lamson tape controlled positioning units hold tolerances of ±.001 on applications for punching, drilling, boring or similar operations where point-to-point positioning is mandatory. Machine set-up and change-over become primarily an office procedure. Numerical control of machining operations eliminates the need for cams, templates, even prototype parts and special fixtures. It results in greater machine utilization, and speeds actual machining. Lead time is reduced, and because human error is largely eliminated, accuracy is improved.

Any way you look at it, numerical control has come of age. It's being used more and more, simply because it produces better, at lower costs. For detailed information, write Jones & Lamson Machine Company, Dept. 710, 511 Clinton Street, Springfield, Vermont.

Turret Lathes • Automatic Lathes • Tape Controlled Machines • Thread & Form Grinders • Optical Comparators • Thread Tools



Are You Getting What You Pay For?

When you pay for HIGH QUALITY high-carbon wire, you want to be sure you get it. You do, when it is supplied by Roebling.

It is unsurpassed in quality, consistently true to specifications, and absolutely uniform in gauge. Hundreds of manufacturers attest to this fact . . . the qualities that they *pay* for—they *get* in Roebling high-carbon wire. The length of our relationship with customers proves it.

We'll be glad to show you what we mean. For information on superior high-carbon wire or cold rolled strip, write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

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Roebling... Your Product is Better for it

This lightweight "No Charge" spool is typical of Roebling's modern packaging methods that save customers time and money.

a new, improved ALODINE for aluminum

Cost Saving, Time Saving ALODINE 1200S Pre-Paint Treatment Protects Aluminum Best!

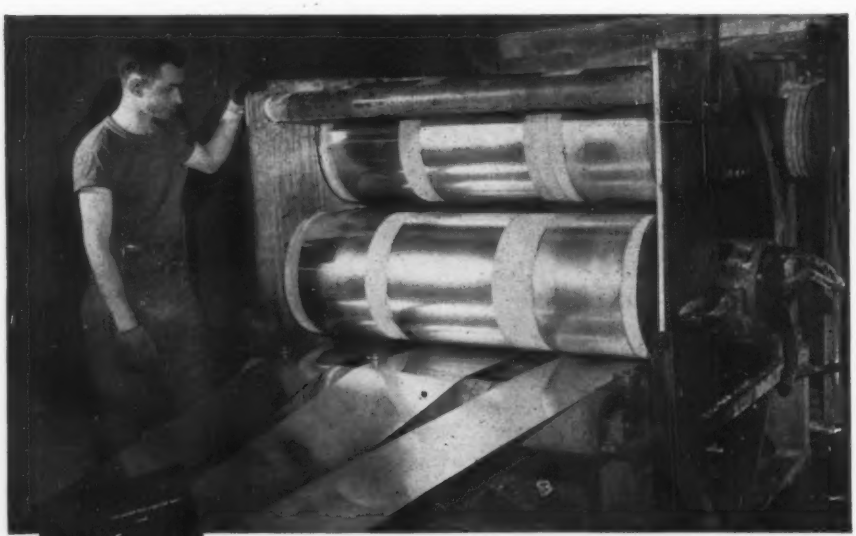
IN LESS TIME—ALODINE 1200S provides increased chemical activity for dramatic reduction in processing time . . . up to 50% in most cases! You get far faster processing than ever before, with the same high quality protection!

WITH LESS EQUIPMENT—You can install an ALODINE 1200S system quickly and conveniently, *without resorting to mechanical bath maintenance!* That means no dangerous, time consuming checking routines with the possibility of bath contamination always present!

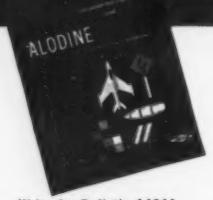
AT LESS COST—ALODINE 1200S can be processed through continuous dip in the same time cycle other conversion coatings require for continuous spray lines! This dip technique reduces initial equipment costs, slashes maintenance costs to a minimum and allows aluminum fabricators to utilize conversion coatings more frequently for a wider range of product applications! Whatever the application method—brush, dip, continuous strip or spray—ALODINE 1200S may be the answer to your production problems.

FOR MORE FLEXIBILITY—Most important, its ease of operation, safety in use and versatility enables ALODINE 1200S to answer one of the most perplexing problems inherent in providing corrosion protection and paint bonding qualities for aluminum—the problem of constant, uniform quality. ALODINE 1200S is qualified under Government Specification MIL-C-5541.

Investigate cost saving, time saving ALODINE 1200S today! And whenever you have a chemical finishing requirement for aluminum—any type of aluminum—there's an ALODINE process available to protect or decorate the metal, and anchor the paint finish more securely.



Typical ALODINE 1200S strip line installation at ALSCO, INC. Strip from aluminum coil is fed into Alodine processing baths where it is cleaned, rinsed, deoxidized, rinsed, coated with ALODINE 1200S, rinsed and given a final acidulated rinse. Strip is then rewound, roll coat painted, roller formed into final shape, backed, inspected and packed for final shipment.



Write for Bulletin 1424A describing use of Alodine for aluminum fabrications of all types.

AMCHEM

ALODINE 1200S

another chemical development of **AMCHEM PRODUCTS, INC., Ambler 26, Pa.**
(Formerly American Chemical Paint Co.)

Detroit, Mich. • St. Joseph, Mo. • Niles, Calif. • Windsor, Ont. Amchem and Alodine are registered trademarks of Amchem Products, Inc.

STEEL'S MONUMENTAL STARTUP JOB is going faster than most expected. Finished steel can't come fast enough to stave off further cutbacks in major industries, but the startup news is cheerful. Sales executives want to avoid raising false hopes, but production men call the startup the cleanest ever after a strike. Three factors are responsible: Thorough planning before, during, and after the strike; less damage than feared; better than expected worker cooperation in the face of the injunction.

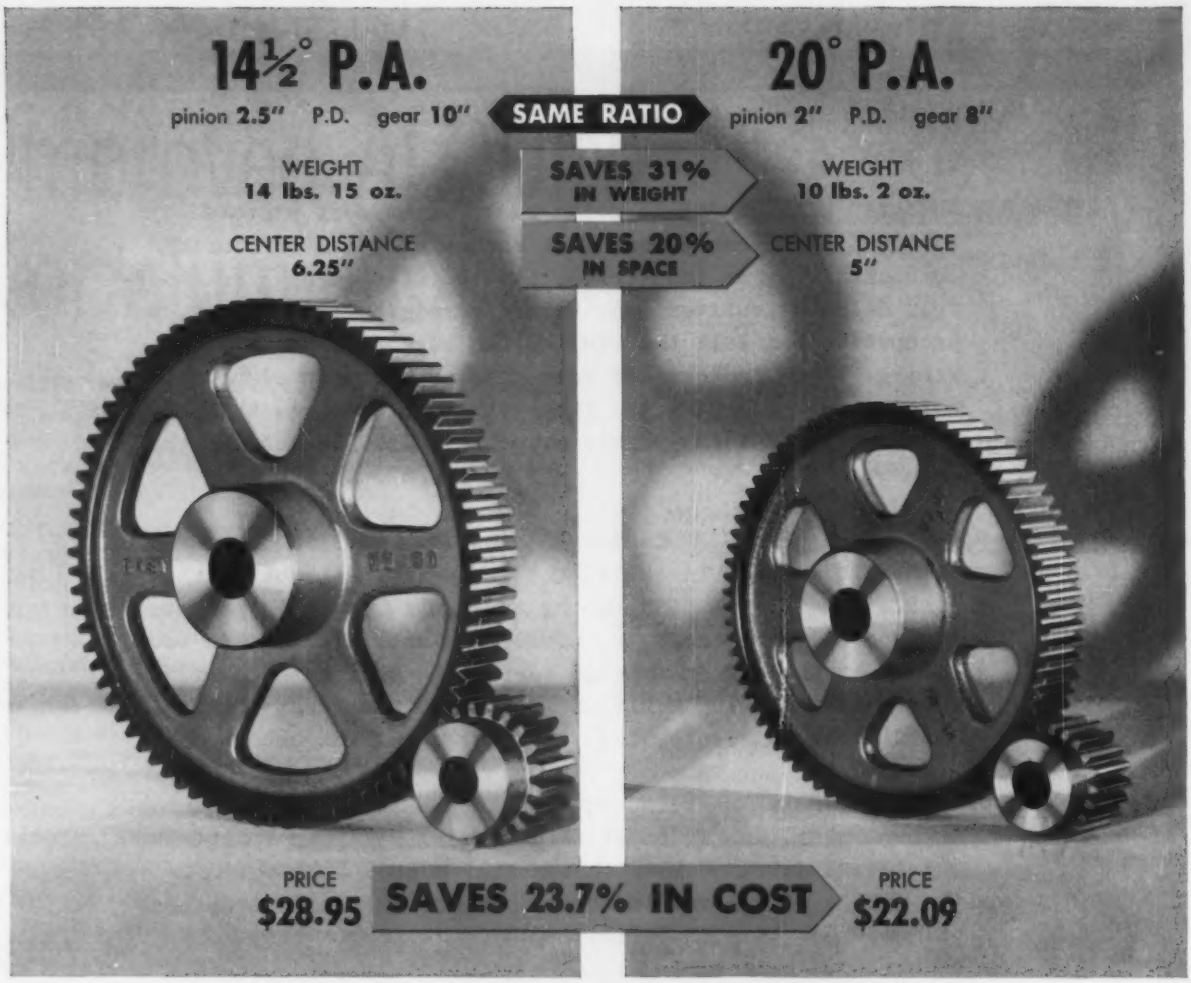
FOREIGN MARKETS WILL BE EASIER to tap if a new bill passes next session of Congress. HR 5 is called the first real attempt by the U. S. to match the USSR in the trade war. It would permit incorporation in the U. S. of foreign subsidiaries and would permit tax relief on foreign operations during the period when they are being built up through reinvestment of earnings. Opposition can be expected from government tax people.

DOLLAR VOLUME OF MATERIAL HANDLING equipment orders made a big comeback in September. The index of the Material Handling Institute hit 126.43 (1954 — 100) that month, a good comeback from the anemic 87.0 level in August. Eugene Caldwell, president of MHI, reports optimistically: "This could be the beginning of a stepup in spending plans by business for industrial material handling equipment."

STRUCTURAL FABRICATORS ARE TURNING TO AUTOMATION to cut costs. And more than a few in the industry admit it's long overdue. Fabricating capacity is far in excess of demand and bidding is cutthroat. But new equipment for automatic handling of structurals is expected to cut costs significantly.

AN INDEX OF INDUSTRIAL FASTENER SHIPMENTS is expected to be a good, new planning asset. The Industrial Fastener Institute will now publish its index of shipments monthly. Plotting of the index over recent years indicates that fastener shipment trends led changes in the business cycle.

ADVANCES IN METALS AND PLASTICS will result in major changes in industrial design. This is the conviction of Dr. B. D. Thomas, president of Battelle Memorial Institute. High-strength steels, new aluminum alloys and new plastics will give designers a range of creativity undreamed-of until recently. Designers of the future may call for about any shape they want in high-alloy steels, refractory metals, and even the carbides of refractory metals.



Both meet the job specifications — but

one of these gear sets costs you 23% less

NOW...567 STANDARD SIZES OF BOSTON 20° P.A. GEARS FROM STOCK

SPUR Steel and Iron 20 to 4 P.
Fine Pitch Brass 64, 48, 32, and 24 P.

MITER Cast Iron 8 to 2½ P. Steel 48 to 4 P.
Fine Pitch Brass 48, 32, and 24 P.

BEVEL Steel and Iron 20 to 3 P.
Fine Pitch Brass 48, 32, and 24 P.

For complete listings see the BOSTON GEAR CATALOG No. 57

Every engineer knows the quiet-running efficiency and high strength of the 20° Pressure Angle tooth form. For most installations, the 20° P. A. Gear that meets specifications saves an average of 20% in space, weight, and cost over the comparable 14½° P. A. Gear required.

Now, the types and sizes of 20° P. A. Gears you need to make these big savings in your assemblies are available, anywhere in industrial U.S.A. and Canada, FROM STOCK at over 100 conveniently located BOSTON GEAR Distributors.

Your local Distributor's factory-trained gear specialist is at your service. Get details. Start *making* the savings you've been missing. Boston Gear Works, 72 Hayward St., Quincy, Mass.

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CALL YOUR NEARBY

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For nearest Distributor LOOK UNDER "GEARS" in the Yellow Pages

— STANDARDIZATION PAYS —®

RACE AGAINST TIME: Night ore loading at Seven Islands, Quebec, illustrates rush to resume steelmaking.

How Advance Planning Speeded Steel Mill Startup

Large-scale push to get supplies into mills was planned well in advance.

Quick movement of ore, coke, scrap and other supplies helped get operations off to fast start. —By G. J. McManus.

▪ One of the biggest supply pushes in history was touched off Nov. 7 when the Supreme Court upheld the injunction ordering steelworkers back to the mills.

Coal, ore, scrap, and other supplies began flowing into steel plants within hours of the ruling. Trucks, freight cars, and barges began converging on the mills.

Some idea of the size of this operation can be seen from the fact that every ingot ton calls for roughly 2000 lb of ore, 1000 lb of scrap, 500 lb of limestone, and 1000 lb of coke. (Individual mills may vary from these industry averages.)

On the Move—To make 1.3 million ingot tons in the first week of operations, steelmakers had to provide 3.2 million tons of raw materials.

Moreover, basic materials must actually be moving for the big mills to operate. Transport vehicles feed much of the charge material directly into producing units. Supply is an important part of production.

"The big coal and ore stocks are primarily surge boxes," explains Ralph C. Moffitt, vice president, purchases, United States Steel Corp. "You dip into them only for peak needs. Ideally, material flows directly into production with no stockpiling. You would never have the handling capacity to pick up all raw materials from stocks."

Fast Pace—How well the steel industry was able to mobilize this kind of a supply flow is indicated by U. S. Steel's operating figures. Central Operations (two-thirds of all USS) was running at 25 pct of capacity three days after startup. Seven days after the decision, the same group was up to 60 pct.

U. S. Steel's startup went forward with surprising smoothness. Ore and coal cars began moving almost immediately. Shipping releases went out to refractory producers and scrap dealers the morning of the startup. General suppliers began shipping according to schedules planned during the strike.

Few Emergencies—"There were phone calls from the plants," says Bill Crawford, director of purchases for U. S. Steel, "but no more than usual." Only two emergency con-

RAPID PACE: Fast flow of materials aided startup in steelmaking. While workers return (left) at U. S. Steel plant, giant unloaders are ready to fill cars lined up at Great Lakes ore pier.

struction orders had to be placed."

Early preparations played a big part in this fast getaway. Last spring U. S. Steel purchasing men started asking questions and thinking about strike prospects. Detailed plans were drawn up for four possibilities: (1) Reduced operations without a strike in the summer; (2) A strike with operations resuming at a high level; (3) A contract extension with a strike threat; (4) Day-to-day operations with a shutdown threat.

Supply Flow Planned — As a basic minimum, the plans called for a supply flow that would meet the reduced needs predicted for the summer. Contract commitments were made on the basis of normal requirements at a high operating level. A fixed scrap reserve, geared to high operating levels, was maintained. Ore supply proceeded at maximum rates.

When the strike deadline approached, various materials were handled in different ways. Scrap shipments were first shut off June 22. They were partially resumed July 1 and cut off again July 7.

On ore and coal, the idea was to keep pipelines full, all the way to the mills. There was some adjustment of schedules to reduce freight demurrage charges, but no blanket cutoff. Material kept moving right up to the deadline; then it stopped at various points in transit.

"It's like the engine of a car," explains Mr. Moffitt. "You switch off the ignition and there's fuel left in the carburetor and tank lines. Hours or days later, you start right up."

Last-Second Cutoff—In a slightly different manner, material stocks were keep up for maintenance and general supplies. No effort was made to stop shipments in advance of the strike. The cutoff was applied only after the actual walkout. At that time telegrams went out to 10,000 suppliers, advising them to suspend shipments.

Once the strike was underway, U. S. Steel purchasing men reviewed all open orders. Product by product, requirements were analyzed and delivery schedules set up. Letters were sent to suppliers, telling how many days after the strike shipments would be accepted.

"If we had not done this," says Mr. Moffitt, "we'd have gotten the equivalent of two months' orders in two weeks time."

Scrap Readied — During the strike, U. S. Steel lined up dealer scrap at major centers, advancing cash to cover most of the tonnage ordered. Customer scrap was diverted to dealer yards for the most part.

Stockpiling Systems — Outside storage was used to some extent for lumber, refractories, ferroalloys and other supplies. In the case of refractories, U. S. Steel backs up all furnaces with mill stocks sufficient for normal maintenance. No great effort was made to supplement these during the strike.

A good part of the stockpiling job was handled by suppliers on their own initiative. Refractory producers built up large stocks during the strike. Outside suppliers loaded 2400 coal cars for later consignment to U. S. Steel.

"A great deal of credit goes to suppliers," says Mr. Moffitt. "They enabled us to preserve the flexibility so necessary in the present situation."

Pressures on for Steel Settlement

Secret talks give some small hope for progress in steel negotiations.

Both sides hope to avoid a second strike and tough government action.—By Tom Campbell.

▪ The steel union is worried sick about the possibility of sending steelworkers out again on January 26 when the present injunction runs out.

The steel companies are worried just as sick over the certainty that if no settlement is reached there will be legislative compulsory arbitration.

Secret Meetings—These are two reasons why negotiations were stepped up late last week at secret meetings between Steelworkers' chief David McDonald and steel representatives.

While no concrete settlement terms were reached, and while no settlement is yet in sight, the atmosphere has changed from what it was a month ago. Mainly because of intense pressure on both sides.

The Issues — Mr. McDonald is holding out for an economic package similar to the Kaiser deal of 11¼ cents per hour per year (22½ cents in 2 years).

The big stumbling block is the fight over the local practices clause (2-B) which the steel firms want changed to give them power to set up more efficient work rules.

The best guess on 2-B is that if it goes to arbitration the language to be arbitrated must be a two-way street with the union mentioned as equitably in the clause as is the companies. In the sentence turned down by the steel union, the entire problem dealt with the companies alone, according to Mr. McDonald. For that reason the union turned it down.

Not Too Much Optimism—The meetings late last week were so secret that few if any outsiders knew about them. They were more than the usual free-for-all that Mr. McDonald and R. Conrad Cooper, U. S. Steel V. P. and chief negotiator, have had from time to time. Also there was more than one meeting in the second half of last week.

The secret meetings did not bring either side close enough together to cause a surge of optimism. But they did clear some of the air between Mr. McDonald and the top steel company representatives.

While Mr. McDonald is dickering with the steel side, he is also trying a massive encirclement with agreements in aluminum, can companies, and copper. It may be that he will get some or all of these agreements before steel.

Possible Package — Whatever steel and union sign, either voluntarily or government-pressured, will be classed as non-inflationary. It will probably run for three years and may be sweetened slightly from the last offer made a few weeks ago (10¢ an hour wage fringe cost).

Vice president Nixon has been tough on both sides in the past week. He has told the steel and union side in no uncertain terms that what congress and the President have in store would be far from what either wanted.

Meanwhile, both sides still looked ahead to a possible last offer vote. (See box.)

Whether this new twist in the steel negotiations will fall on its face remains to be seen. If it were not for the intense pressures being put on steel and union to settle, the secret meetings could be completely discounted.

If There Is a Last Offer Vote—

Who Votes?

All members of the bargaining units as certified by NLRB. Thus, executives would not vote, but voting would not be restricted only to union members.

How Is Voting Conducted?

The NLRB works out the voting system, by plant, company, and area, in consultation with unions and management. In past elections, it has been broken down by areas without regard to companies, by companies without regard to locality and some throughout the entire industry.

Is Election Binding?

The answer is no, as far as most lawyers see it. It has never been tested. There is no indication that the results are more than for information for the union, management, and public.

What Goes on the Ballot?

The ballot contains whatever the employer wants to have printed on it. Presumably, the NLRB will set up the vote to recognize that different companies, and even different units in companies, get different offers if the companies want to make them. The last offer on the ballot may be brand new when printed.

Fabricators Look At Automation

It Is a Needed Change for Cost Cutting

Structural fabricators are turning to automation to cut costs. Some say this trend is long overdue.

Business is higher than in 1958, but there is still not enough business to go around.

▪ With backlogs thin and pricing destructive, structural fabricators are looking eagerly to automation for cost relief.

The price problem is still serious with fabricators. There is not enough work to go around. Bookings are running 13 pct ahead of 1958. Shipments* and bookings for the total year will total about three million tons, far below capacity.

Greater Shipments—In the peak year of 1957, fabricator shipments topped four million tons. Since then, fabricating capacity has increased about 30 pct. That would put current capacity at five million tons and even this figure does not represent a rigid ceiling on structural work.

Faced with these crises, structural fabricators are turning to automation for cost relief. Some say it is long overdue.

A British developed line attracted much attention last summer (The IRON AGE, Aug. 6, p. 90). And last month Pittsburgh's Mulfab Corp. came out with an assembly that moves, cuts and drills structurals in highly automated sequence.

Wide Interest—Mulfab's brief letter announcing the assembly was mailed to 200 fabricators. Over 150 replies came in asking for more data. Several hundred men in the industry went to Pittsburgh to see the assembly demonstrated in Mulfab's own fabricating shop.

At the initial showing, fabricators saw two men run structurals through the full cutting-drilling cycle. One man fed beams from a loading table into a cold saw. With the aid of an optical gaging device, he positioned the beam for cutting. A cold saw made the cuts with a milling rather than a chipping action.

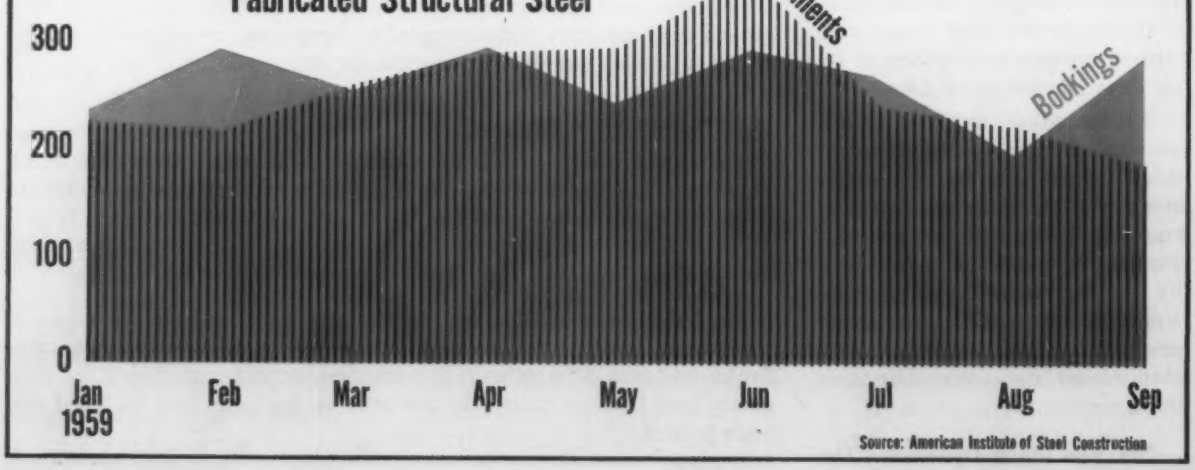
After cutting, the beams traveled by conveyors to a gantry-type drilling machine. The second worker used an optical viewer to position the work. A single stroke drilled all holes, horizontal and vertical.

Cost Cutter — With all layout work and all crane movement eliminated, Mulfab feels its equipment will save over 50 pct on average jobs. The company feels its system offers special advantages of favorable pricing, precise positioning, automatic adjustment for beam waviness, and simultaneous drilling in two directions.

Mulfab presented its development to an industry highly receptive to new ideas. Structural men say heavy fabrication is long overdue for automation. They see price pressure making new methods particularly attractive now.

The Only Problem—"We prefer to think . . . total productive capac-

Bookings 13 pct Ahead of 1958



ity (is) limited only by the supply of raw materials," says H. B. Dietrich, president, American Institute of Steel Construction. "The raw material problem, we now feel, has been solved."

The last statement is backed by steel mills. They point out structural rolling capacity is now eight million tons. By 1965 it will hit 8.5 million tons. The most mills have ever shipped is 6.8 million tons, and that was in 1957.

Competition—In any case, there is clearly enough fabricating capacity to promote hungry bidding for available jobs. Prices are running $40 to $50 a ton under 1957 levels. Shops are bidding below cost to get work.

To stay alive in this type of battle, fabricators need more efficient production. They know this and they know there is plenty of room for improvement. "There have been refinements in individual tools, but basic methods of handling and stationing have not changed in 50 years or more," says a top engineer.

Little by Little — The difficulty has always been that structural work does not lend itself to long runs and automated handling. There is too much variety from job to job and within individual jobs. Efforts by the American Institute for Steel Construction and others are bringing some standardization. But progress is slow.

"An architect is not a conformist," says one fabricator.

Variable Use—The new lines answer this problem with designs that will accommodate a wide variety of structural members. According to one outside estimate, the Mulfab line will handle 80 to 90 pct of the general work for a building job; 75 pct for industrial building, and a major part of the structural fabrication for large furnaces and similar installations.

For shops with special requirements, the Mulfab line can be engineered with different size specifications.

U. S. Steel Changes

Worthington Named President

▪ An era of marketing.

That's what some steelmen are expecting at U.S. Steel Corp. with the election of Leslie B. Worthington as its president and chief administrative officer.

Mr. Worthington moves up from the presidency of the Columbia-Geneva Div. of U.S. Steel. He has also been president of U.S. Steel Supply Div., the warehouse arm of the Corporation.

Strong Marketer—Says one observer, "The Corporation now has at its helm a complete salesman who has been through the roughhouse of Chicago warehouse steel selling as well as the top levels of a division president."

Though his career has been forged on the sales side of the steel business, Mr. Worthington has a good knowledge of mill operations from his stay at Columbia-Geneva.

Tough But—His friends say he is tough-minded, but with a keen sense of humor, and has a broad understanding of the steel industry's problems.

The new U.S. Steel president is 57 years of age, married and has two sons.

Also moving up at the Corporation are Harvey B. Jordon, who becomes executive vice president and chairman of the general administration committee; and Edwin H. Gott, who succeeds Mr. Jordon as executive vice president—production.

EXECUTIVES: Leslie B. Worthington, (top) president; Harvey B. Jordon, executive vice president and chairman of the general administration committee; and Edwin H. Gott, executive vice president—production.

Watch for New Fastener Index

It's Expected to Be a Sensitive Business Barometer

Fasteners Institute also calls attention to problems of international standards.

And it reports members are trading with each other to fill stock gaps.—By T. M. Rohan.

▪ The Industrial Fasteners Institute, after being publicity shy for years, broke out of its cocoon last week with four major announcements:

Reports on shipments by members will be made regularly, and are expected to be a sensitive short-range business barometer. (See Chart.)

The U. S. is in danger of getting swamped by foreign countries in standardization of fasteners unless a permanent U. S. chairman is appointed to the International Organization for Standardization.

Duplication in government specifications is monumental. The Institute hopes to help shave down the 400,000 standard specs and 200,000 specials. Fastener specs are 15-20 pct of government specs.

Members of the Institute are now bartering fasteners to plug inventory holes caused by the steel strike. Non-members interested in swapping may write the Institute which will relay the information to its members. Address is 1517 Terminal Tower, Cleveland, 13.

Looking Good—Frank Masterson, Institute president, says most fastener makers were well stocked with steel before the strike, have been able to keep up shipments. On a 1947-49 production index basis, the industry operated at 153 for the first nine months of the year compared to 125 all last year. In 1957 they ran at 162 and in 1956 at 160.

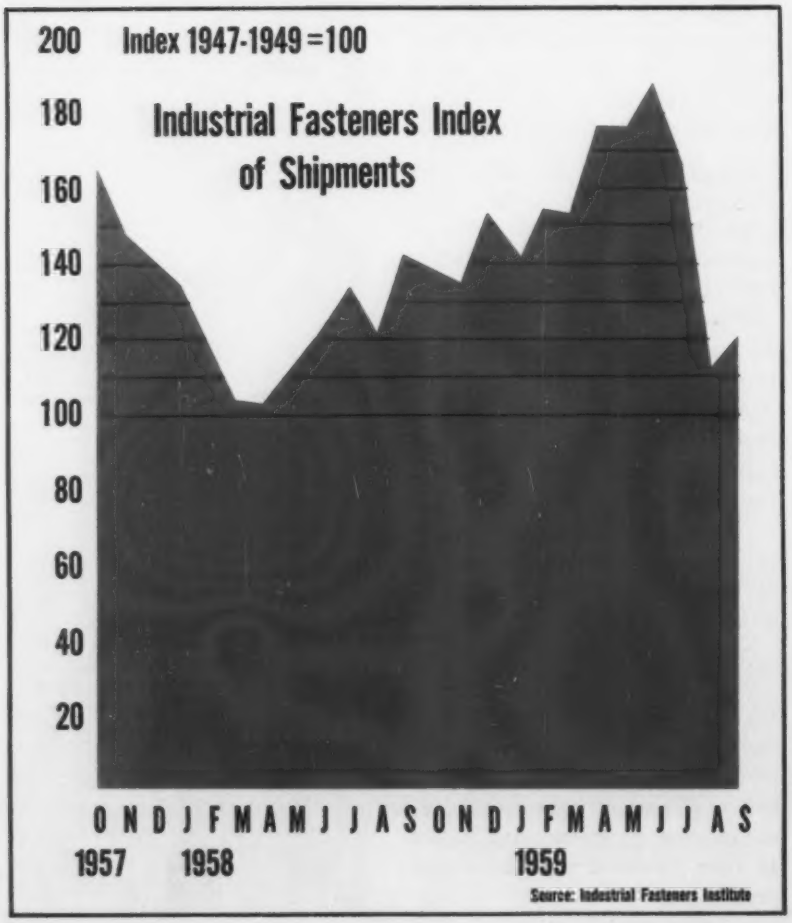
Foreign standardization groups are taking U. S. advances and leapfrogging them with developments of their own. Unless the U. S. gets a permanent chairman to "represent the U. S., we stand to get snowed under in an all-metric-system arrangement," says Mr. Masterson.

Foreign groups meet regularly and exchange developments, while the U. S. is merely an observer, and sometimes not even notified of meetings. The inch system is now used by the U. S. and United Kingdom. There are three metric systems — Russian, German and French-Italian. By unifying the whole system, fasteners would be interchangeable, longer production runs could be made.

Best Seller—The Institute bartering system has blossomed into a daily tip sheet of about five offers which is being sent to the 58 Institute members across the country. Grateful firms have sent in many "thank you" letters for the service.

It lists items offered and items wanted. Firms with fastener inventory problems are invited to list their problem with the Institute.

How Fasteners Reflect Trend



SIMPLIFIED CONTROLS SPEED PRODUCTION Single lever (A), conveniently located, provides full control of spindle . . . four positions permit fast, easy change to forward, reverse, neutral or brake. Convenient trip lever (B) opens and closes the collet and engages feed mechanism — advances stock in ¾ second.

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You also save on tooling inventory and cost. Collets, feed fingers, and turret tools are interchangeable with those of corresponding sizes of B&S Automatics.

For the best return on your investment, make sure you get the machines mated in efficiency with the finest in Automatics — B&S Hand Screw Machines. Four sizes . . . No. **00** ½″, No. **0** ¾″ and No. **2** in two sizes with power feed, 1¼″ and 1½″. For details, write to: Brown & Sharpe Mfg. Co., Providence 1, Rhode Island.

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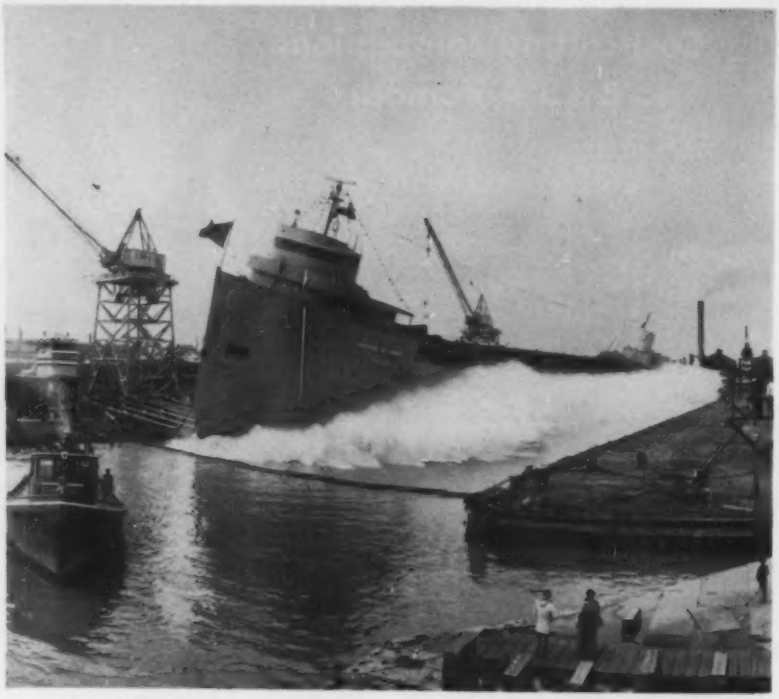
Biggest Splash on the Lakes



FOR THE FLEET—The Arthur B. Homer, largest ore carrier under American registry on the Great Lakes, slides down the launching ramp and into the Detroit River. The new ore boat's 730 ft length and 75 ft beam are the maximum allowed in both the Soo locks and in the locks of the St. Lawrence Seaway.

Steel Imports Up Sharply in September

Imports of steel mill products rose further in September, while exports sank to next to nothing.

The U. S. Dept. of Commerce reports 366,000 net tons were imported, 43,000 tons more than in the previous month, but still well below the record 430,000 tons that arrived here in July.

New High—September increase brought the total for the first nine months of 1959 to three million tons. This is 1.3 million tons higher than the 1.7 million tons imported in all of 1958. And it tops by 800,000 tons the previous peak year for steel mill imports, 1951 during the Korean War.

Imports accounted for 5.4 pct of the total new supply of steel available in the U. S. in the first three quarters. It was only 2.9 pct last year, and 1.7 pct in 1957.

Exports, on the other hand, dropped to 47,000 tons in September, probably due to the U. S. steel strike. The total for the first nine months was only 1.3 million tons, the lowest level of exports since 1936.

Radial Draw Forming Attracts Attention

Radial draw forming machines are getting new attention from government agencies concerned with aircraft and missiles.

A group of Defense Dept. production specialists last week attended a demonstration of radial draw formers at Cyril Bath Co., Cleveland.

"All our missile and aircraft designers ought to have a production man sitting next to them. Then ways of making parts can be worked out from the very beginning. We hope a few of our production men, through this visit, will gain new ideas where established but specialized methods such as this will help turn out parts easier and cheaper," said John H. Williams. He is chief of the production equipment branch, Supply and Logistics Dept., Asst. Secretary of Defense.

He was accompanied by representatives of the Air Force, Navy, Bureau of Ships and Accounting, office of Naval Materiel, Cleveland Ordnance District and Lewis Flight Propulsion laboratory of the National Aeronautics and Space Administration in Cleveland.

Tax Bureau Gets The Other Side

Proposed new regulations to restrict tax deductions for lobbying and propaganda would affect the constitutional right of business and labor to free speech, the Internal Revenue Service is being told.

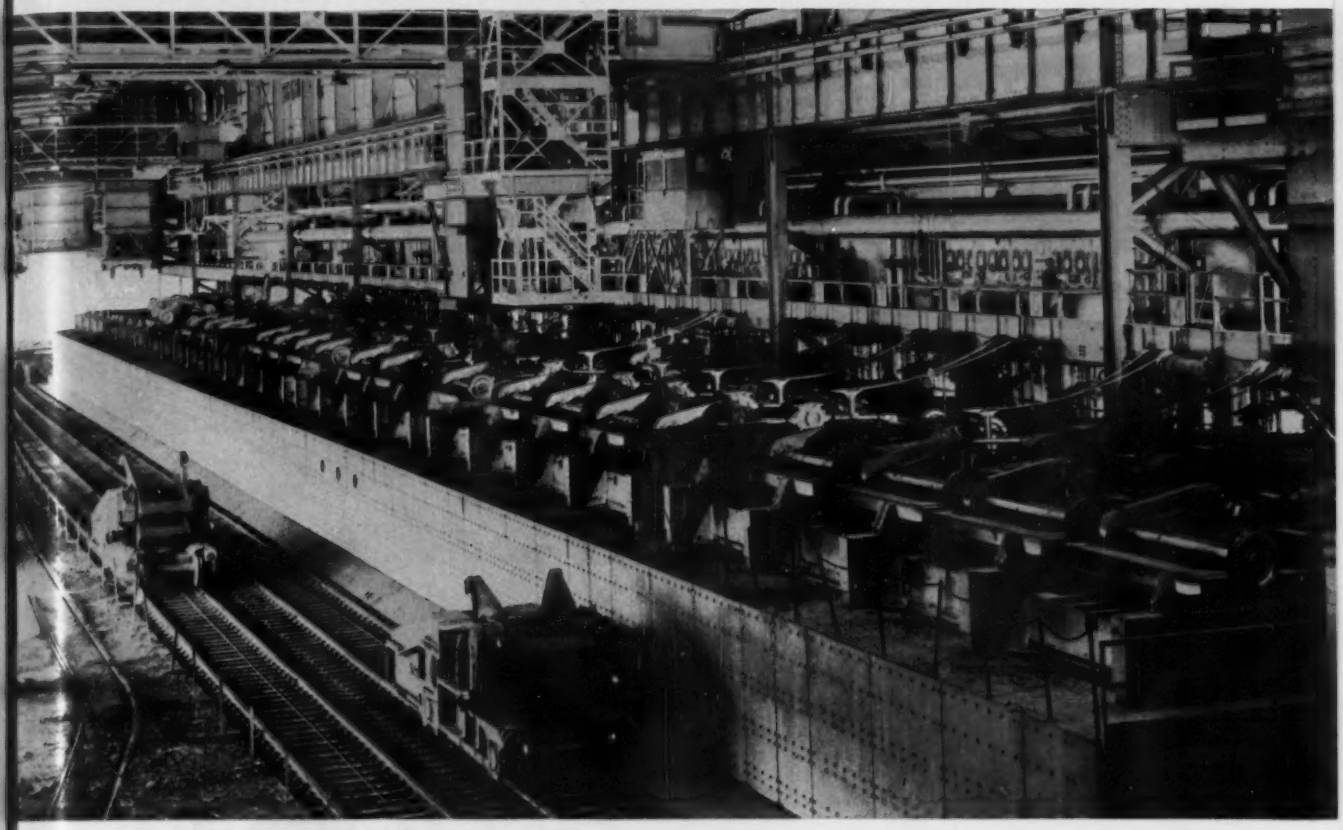
The new regulations would "launch the IRS on a sea of uncertain and dangerous regulation of expression of opinion," Joel Barlow, representing the U. S. Chamber of Commerce, protested at a hearing last week. The proposal is too vague and too broad, and might even apply to the costs of publishing an editorial in a newspaper supporting or opposing legislation.

As proposed by IRS, the new rule would deny tax deductions on funds spent for lobbying, promotion or defeat of legislation, political campaigns, or "carrying on propaganda (including advertising)" for these purposes.

Expenditures for good will advertising and ads which "present views on economic, financial, social, or other subjects of a general nature" would be tax deductible.

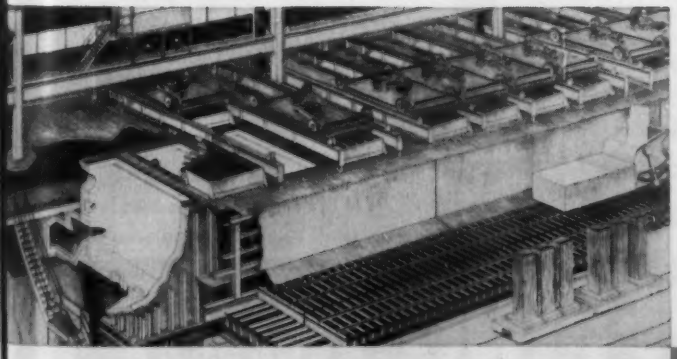
The proposal would prohibit deductions for dues to a trade association if a substantial part of its activities are lobbying, political activities or propagandizing.

For highest performance requirements . . . on installations of every size



SOAKING PITS with new features

by SWINDELL-DRESSLER



Swindell-Dressler leadership in furnace design and construction for the steel industry is exemplified fully in our many Soaking Pit installations.

Let us consult with you on the advantages of air at high pressure and temperature, efficient use of blast furnace gas, and outstanding space-saving features . . . all with the well-known rugged Swindell-Dressler construction developed by our many years of steel mill experience.

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It's easy for the operator to raise or lower loads while pulling a trolley mounted Coffing Quik-Lift Electric Hoist. The design of the pistol-grip control station and the combination strain and power cable makes this possible. The light but strong aluminum housing provides ease of portability. Changing voltages, limit switch, type of suspension or chain is quick because the housing is in sections.

For Safety the control station is made of non-conducting plastic in which the voltage is reduced to 115 volts and the push-buttons are mechanically interlocked. The V-type brake which provides maximum braking surface and positive control of loads is another safety feature.

For Efficiency in load handling specify Coffing Quik-Lift. Twenty models—capacities range from ¼ to 2 tons. Ask your distributor for details or write for Bulletin ADH-65.

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- Pistol-Grip Push-Button Control
- Lightweight Aluminum Housing
- V-Type Brake for Maximum Braking Surface
- Easily Adjusted Limit Switch
- Complete Line of Accessories

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DIVISION OF
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814 Wolter Street · Danville, Illinois

William Pierce

He Built an "On Time" Policy

Allegheny Ludlum Steel Corp. has pinpointed steel delivery dates to the exact week.

William Pierce, vice president in charge of sales, is responsible for the firm's efficient delivery timetable.

WILLIAM PIERCE: Pinpointing delivery dates didn't seem rash.

▪ Allegheny Ludlum Steel Corp. came out of the steel strike with this commitment: Delivery promises for all customers are pinpointed not to the quarter or month but to the exact week.

With backlogs approaching an all-time high and steel supply in a desperate scramble, the move seemed rash. Allegheny Ludlum's Bill Pierce didn't think so. Vice president in charge of sales since 1956, Mr. Pierce points out the first half rush saw AL deliver more than 90 pct of its orders within the week promised.

A Little Embarrassment — The 14-day contract extension actually proved a little embarrassing.

"We had shipped nearly everything on our books by July 1," says Mr. Pierce. "When the extension came, we had no carry over."

This kind of performance is no accident. During Mr. Pierce's time as sales head, Allegheny Ludlum has gone all-out to tighten and sharpen the sales-distribution function.

Something New—A new system of organizing and controlling sales time has added 15,000 calls a year for the district force. The policy of nailing down delivery promises to the week has meant revamping the whole order processing system. New scheduling departments at the plants receive orders directly. A new customer service department supplies central coordination.

All these moves reflect in part the methodical thinking of a technically trained man. An engineer, Mr. Pierce directed research and metallurgy at Allegheny Ludlum from 1950 to 1956.

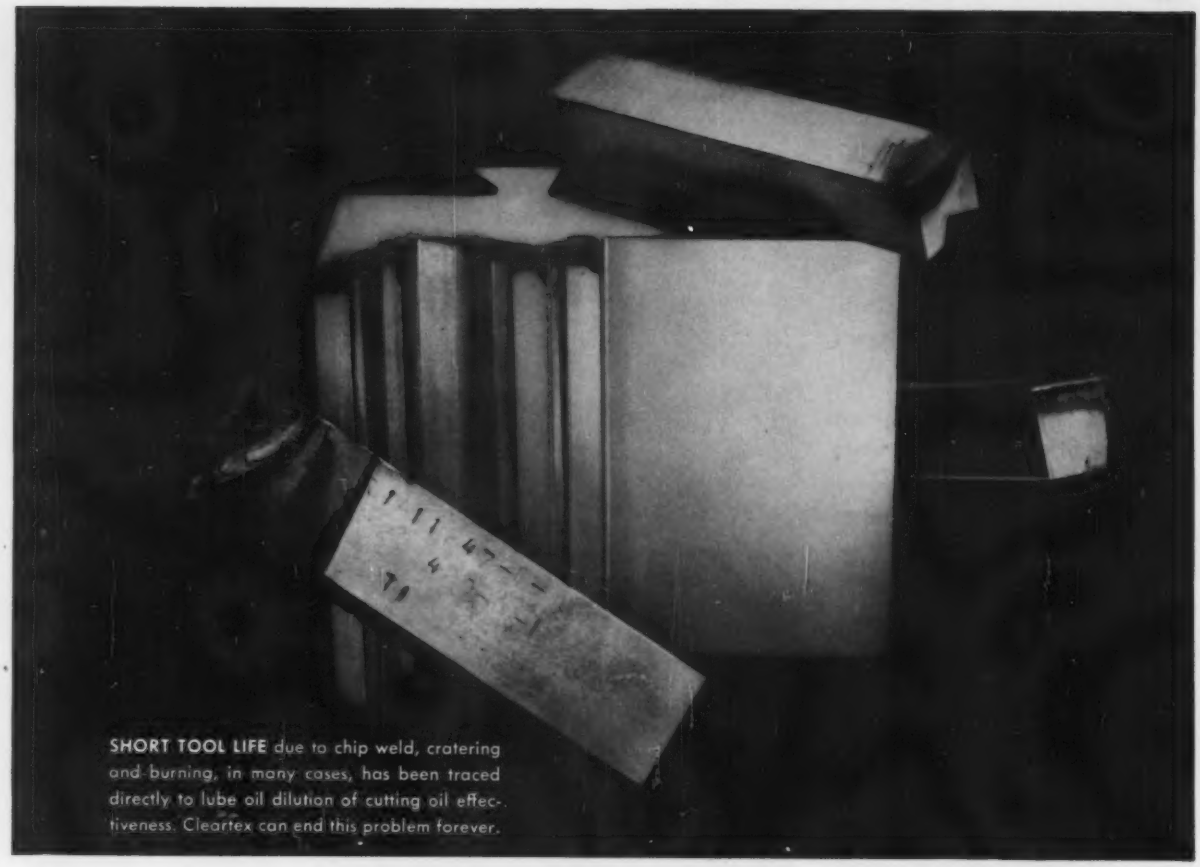
The Sales Job — This technical background ties in nicely with Allegheny Ludlum's selling job. The company produces a wide variety of stainless, electrical and other specialty steels. Salesmen must offer technical assistance and information.

Mr. Pierce understands the need for technically trained salesmen. His department hires mostly engineers. New men are given at least a year of training before making calls. Brush-up sessions keep the field force informed.

Cold Facts Plus—At the same time, Mr. Pierce realizes there is more to selling than cold facts and good administration. He held a top sales job with Rustless Iron and Steel Co. before joining Allegheny Ludlum in 1945. His first AL post was as manager of sales development and engineering service.

This experience enables him to appreciate the human element in sales.

"We want management to know our customers as people," he says. "We want to avoid the tendency to make decisions on the basis of statistics alone."



SHORT TOOL LIFE due to chip weld, cratering and burning, in many cases, has been traced directly to lube oil dilution of cutting oil effectiveness. Cleartex can end this problem forever.

Diluted cutting oil shortens tool life drastically

Lubricating oil is probably leaking into the cutting oil sumps of your automatic screw machines as you read this. Current research proves that this is happening in 70% of all the automatics in use today! And where it happens, it shortens tool life by as much as 50%—even 70%. On top of this, the cost of extra regrinds, lost production during tool changes, and excessive scrap production is putting a premium on screw machine operation in too many shops.

Look for these symptoms. One sure sign of dilution is the need for frequent refilling of the lube oil sump. If you are using an ordinary lube oil, this dilution will create two additional—and more costly—symptoms: excessive scrap production and frequent regrinds. Now you can eliminate these forever with the

TEXACO CLEARTEX CURE

The exceptional chemical stability and load-carrying ability of Texaco's Cleartex series make them equally suitable for use as cutting oils, lubricants or hydraulic fluids. All you have to do is use them for both cutting *and* lubrication. With Cleartex in *all* your sumps, you'll find cutting oil dilution will stop and screw machine production cost will drop substantially.

Write today for your copy of Texaco's helpful new booklet "Cleartex in Automatic Screw Machines"... and contact your local Texaco Lubrication Engineer for an authoritative survey of your automatics. Just call the nearest of the more than 2,000 Texaco Distributing Plants, or write Texaco Inc., 135 East 42nd Street, New York 17, N. Y., Dept. IA-FM-23.

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LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

Short-Term Thinking Dominates

While labor problems remain unsettled, accurate economic planning is difficult.

Short-term planning will get plenty of attention in the next few months.

▪ Business planning is going to be difficult in the next few months. While labor uncertainty lasts, you'll have to deal in short-term plans.

Economists don't believe the steel strike (and other labor troubles) will seriously affect consumer spending. In fact, strike-caused shortages should spur consumer demand. Increased spending for consumer nondurables shows what to expect when more durable goods are available. So does the strong reception given the 1960 model automobiles.

Injunction's Impact — The steel strike injunction won't allow the boom to begin again—just yet. While the injunction lasts (or until the strike is settled) industry is going to have to live with the calendar.

Steel made during the injunction period won't permit full-scale manufacturing. Most users will probably get little more than emergency supplies.

Dates to Remember—In addition, there's always the uneasy prospect of another steel walkout late in January when the injunction dies. Other dates in the coming months are also full of question marks.

The injunction applied to halt the dock strike at Atlantic and Gulf Coast ports runs out Dec. 27. A possible showdown between the railroads and the rail brotherhoods may come early in 1960.

Immediate Outlook — Accurate planning in the face of all these question marks won't be easy. One economist, William F. Butler, vice president of Chase Manhattan Bank, sums up the next few months this way:

"A period of shortages; of scrambling for steel and other supplies, of trying to increase production of metals and metal products to meet urgent demands."

Beyond that point he's encouraged about the outlook: "The first half of next year should be a period of very rapid expansion in production and employment. . . . Production will move toward practical capacity in most lines."

Long-Range View—During the second half of 1960 he predicts "the rate of advance will be slower. The pressure to build inventories will ease . . . the major expansion will be in spending for plants and equipment." (See below.)

Industries to Watch in 1960

▪ If you want to keep close check on the economy, watch these industries: Automotive, appliances, construction, and machinery. How they go in the months ahead will be important.

If these major industries move well as 1960 advances, the economy's health will be proved. But, if the results are disappointing, doubts about 1960 will pile up.

Auto Outlook—At the moment, the automotive outlook is promising. Initial response to the 1960 models is good. Because of steel shortages, the automakers have now cut back or closed down assembly lines.

There is some concern that overall sales may suffer because dealers had too few cars to sell when buyers first wanted them. Tight money may also be a factor in the auto sales picture.

Construction Sound — Construction activity should stay strong in 1960. Every building category, except housing, should show gains over this year, according to F. W. Dodge Corp. The downturn in housing, Dodge says, will be offset by gains in non-residential building and heavy engineering contracts. Here again, some of housing's problems will come from the money squeeze.

The outlook for machinery makers is encouraging. The market is closely tied to capital spending plans. And all signs indicate a high rate of spending for new plants and equipment well into 1960.

Why Plant Expansion Keeps Growing

Industry will be spending about $30 billion a year for plants and equipment by 1970. That's the prediction of Walter A. Edwards, Deputy Secretary of Commerce for Domestic Affairs.

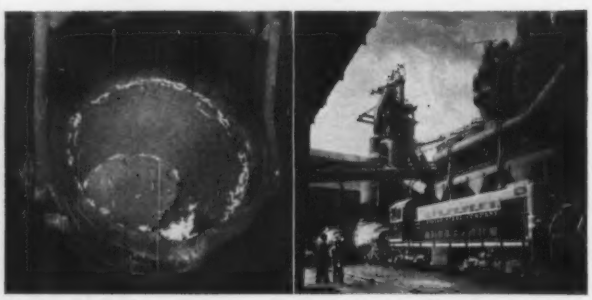
These reasons are bringing about "mushrooming outlays in this field," according to Mr. Edwards: Population growth, obsolete plants, changes in marketing patterns, and new product developments.

FIRE CLAY ...specifically Goose Lake Fire Clay serves the metal producing industry in many important ways

IN FOUNDRIES...

Fire Clay in pulverized or flour form provides an ideal bond for molding sands. As a special service, bulletins entitled "How to Improve Molding Sands" are periodically published and distributed free to the foundry industry. Helps foundrymen keep up to date on molding sand additives. Fire Clay Castables can be "gunned-on" to line cupolas . . . cuts lining time 75%, reduces refractory costs 43%. Fire Clay Brick provides an excellent lining for ladles. Goose Lake Fire Clay is widely used wherever intermediate heat-duty requirements must be met.

IN STEEL PLANTS...



Goose Lake Fire Clay provides an excellent mortar mix for general bricklaying purposes and for laying-up ladle brick (also made of fire clay) in iron and steel ladles. Generally used to form ladle wells, for plugging tap holes and, when mixed with grog, to line blast furnace troughs. Ideal for lining the bottoms of Bessemer Converters . . . for general mudding and daubing operations and as a fill material between the lining and shell of blast furnaces.

Readily accessible deposits of high quality clays, continuous research and quality controlled manufacturing procedures all add up to the fact that "Illinois Clay" offers a prime source for fire clay products. Take advantage of our long experience in this field . . . write or phone for additional information.

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MANUFACTURERS OF: GOOSE LAKE Ladle Brick, Ground Fire Clay, Fire Clay Flour; GRUNDITE Bond Clay; FIROX; THERM-O-FLAKE Insulation Coating, Brick, L.B. Block, Concrete; CHEM-BRIX, Silica, Carbon

AN IRON AGE SPECIAL REPORT TO MANAGEMENT

How to Bring High Marketing Costs in Line

By T. J. McGann, Consultant, New Rochelle, N. Y.

Analysis is the payoff in distribution cost studies.

Decisions made at this stage will bear directly on net profits.

Here are some of the factors to consider in analyzing distribution costs.

■ Excessive marketing costs are a serious threat to net profits. They're not only hard to pin down but management often doesn't even know they exist.

A high-gross profit item, for example, may actually be draining net profits because of the high cost of bringing it to market. On the other hand, a low-gross profit producer may contribute high net profits.

Distribution Cost Analysis
Part 3 of a Series

This is the last of a three-part series on distribution cost analysis.

Part one in the November 5 issue told of the benefits to be gained from such a program. Last week's issue pointed out the problems in organizing a sound program.

Organize Costs—One way to uncover hidden marketing costs is through a distribution cost analysis program. Since it compiles marketing cost data by functions, management can review marketing policies, methods and procedures in terms of cost and income.

Under a distribution cost analysis program all operating costs are assembled into functional cost centers. Each functional cost is then allocated to a product, territory or customer group according to their demand on each function.

The profit and loss statements prepared by products, customers, territories, etc., are the most helpful results of a distribution cost analysis. They will answer the questions most frequently asked by management.

But in analyzing these statements management must be most careful. Decisions made here will have a

Ground Rules for Sound Cost Analysis

Analysis is the payoff in a distribution cost analysis program. Here you review your results and make your moves to improve net profits. These broad rules can be used as guideposts:

Set Up Priority

Your first study will probably turn up several problems. Don't try to tackle them all at once. Set up a priority and solve the problems in order. Management, particularly top management, has a tendency to take on all problems at once.

Spread the Work

In assigning problems, don't give out more work than can be handled in a reasonable amount of time. Spread out the problems as much as possible so the work load is evenly divided.

Measure Results

When steps have been taken to solve a problem, wait a reasonable time. Then check the net profit improvement. Get the value of the decision in dollars and cents. This is the best test of the program.

Check All Angles

Keep in mind that cost inefficiencies may affect the results of your studies. A problem may be a combination of high costs and poor selling practices.

Withhold Judgment

The first study is only a starting point from which to make improvements. Don't assess blame or praise for the results shown on the first statement. Later on the responsibility for a good or poor showing can be pointed out.

direct bearing on net profits.

Check Methods First—At first profitability statements should critically be reviewed only from the standpoint of accounting construction.

While attention may be drawn to the results, remember they are meaningless, and even dangerous, if the data are prepared improperly. Therefore, interest should first focus on the mechanics of the statements. Before attempting to analyze them, two questions must be settled:

1. Have the operating costs been properly catalogued by functions?

2. Have the functional costs been properly allocated to the items (products, customers, etc.) you want to measure?

Predjudice can play no part in this evaluation. Frequently, long-standing beliefs relating to performance, particularly product performance, will be upset. It's hard to think that a "pride and joy" product can be a loser and some other a winner.

Problem Areas—It's impossible to tell before hand the types of problems a company will uncover in a distribution cost analysis program. However, here are some general problems companies using this type of program have run into:

Operating Costs

Many companies found the cost of some functions on the high side. They discovered this out by comparing them with industry figures, geographic non - competitors or branch operations.

In analyzing costs it helps to look at them in two ways—from the viewpoint of a dollar outlay and efficiency. For example, for the money a company pays out in wages, supplies and forms to process orders, it expects a certain number of orders to be processed.

Set Standards—Outlay comparisons provide the opportunity to compare regional pay scales and check whether they are high or low. Efficiency comparisons tell whether you are getting top performance.

Such a study permits the setting of standard costs for each function. Once they've been set and met, your costs should be more efficient and your net profits on the upturn.

Products

The purpose of product analysis is to improve the net profit performance of the entire product line.

This should be approached by: a.) Pinpointing the source of loss in unprofitable products; and b.) figuring out the effect of volume changes on net profits on profitable and unprofitable products.

If loss items can be brought at least to zero profit and volume changes on profitable products are significant—then it's possible to improve net profit greatly. This approach is merely one of playing to strength and correcting weaknesses.

What Causes Losses—Distribution cost analyses bring to light many sources of product losses. Some of these are:

A product may have a good cost pattern but is suffering from lack of volume. Salesmen may not have the proper training in the product and can't point out its benefits. Therefore, they don't try to push it. Retraining and an incentive set up may bring them into the black.

A product may have a gross profit rate too low to support sound operating costs. Manufacturers cannot expect to keep all the profit in the manufacturing division. Marketing units must make a profit, too. Gross margins must be high enough to attract the selling interest of marketing divisions, branches and distributors.

Check Handling — A product may lose money because of low inventories. You may be playing inventories too close to the vest to service customers properly. Inven-

Check Net Profits by Customer

Statement of Customer Profitability

	Customer	
	ABC Co.	XYZ Co.
Sales	$1,450	$1,500
Cost of sales	1,015	1,045
Gross profit	435	[redacted]
Costs distributed on:		
Sales base	15	15
Cost of sales base	5	5
Number of Orders	105	150
Tonnage base	190	209
Calls base	54	120
Gross margin base	6	6
Sum total of cost base	20	30
Total	395	535
Net Profit before Tax	$40	[redacted]

Despite Higher Gross Profit X Y Z Co. Shows a Net Loss

Both of the above customers bring about the same gross profit. But a distribution cost analysis showed only one provided a net profit.

tories should be adequate to fill orders in the normal course of business.

A product may suffer a loss because of the way it's stored. It may take up too much floor space or is not too easy to get at. Generally, you can assume that square footage can be added at a lower rate than material handling cost since the latter is largely labor.

A product may not be given enough promotion. You may find this out by checking the effect of volume changes on net profit. If so, you can adjust your advertising and outside selling programs to bring the product into a profit position.

Territories

The best coverage at the lowest cost is the objective of a territorial analysis. Some reasons for losses in this area include:

You may be spreading yourself too thin. This will show up in high outside selling costs in relation to sales volume.

Certain territories may not have the potential to support a sound territorial cost. Even if you got all the business in a territory, its volume and gross profit might not be enough to support sound costs. You may have to give your salesman more territory and more potential volume to produce a net profit.

Adjust Pattern—The selling pattern in a territory may not be the best for your company. An analysis of the best, average and poorest territories will help you determine the most effective selling pattern.

Potentially good territories may show net losses because of low incentive payments. An incentive pay program based on net profits may be necessary to bring a loss territory to a profit.

Profits

Net profits by customers is shown in a statement of customer profitability. These have tremendous possibilities and should be studied with the statement of territorial profitability for greatest effectiveness.

How Some Products Drain Net Profits

Statement of Product Profitability

	Total	Prod. A	Prod. B	Prod. C	Prod. D
SALES	$6,155,900	$215,354	$328,172	$1,480,500	$384,580
COST OF SALES	4,697,136	134,580	263,832	1,136,548	309,480
GROSS PROFIT	1,458,764	80,774	64,340	343,952	75,100
Product Costs					
Purchasing	29,384	840	1,648	3,252	1,936
Order Processing	67,332	8,780	3,668	6,498	6,604
Packaging	145,236	3,852	7,496	18,422	12,045
Materials Handling	152,498	5,835	8,260	28,318	14,989
Delivery	172,404	12,056	7,044	21,698	14,476
Inventory Space Cost	62,498	4,682	2,650	14,456	8,572
Advertising	81,944	2,868	4,368	9,280	5,120
Total	711,296	38,913	34,134	101,924	63,742
Profit after Product Cost	747,468	41,861	30,206	242,028	11,358
Customer Cost					
Outside Selling	280,720	14,304	24,660	42,756	17,148
Inside Selling	90,212	11,764	4,916	12,910	8,852
Administrative Selling	32,488	1,816	1,444	7,452	1,688
Credit Authorization and Collection	30,016	3,916	1,636	3,818	2,954
Bad Debts	15,332	92	256	1,236	192
Total	448,768	31,892	32,912	68,172	30,834
Profit after Customer Cost	298,700	9,969	(2,706)	173,856	(19,476)
General Costs					
General Administration	112,460	4,724	7,254	16,189	4,222
Accounting	34,192	1,245	3,188	7,252	2,356
Inventory Carrying Cost	23,768	1,400	3,796	5,616	1,233
Total	170,420	7,369	14,238	29,057	7,811
Net Profit before Taxes	$128,280	$2,600	[illegible]	[illegible]	[illegible]

These Drain Net Profits

Product C Supplies Over 100 Pct of Total Profits

Here's why some customer statements turn up losses:

Too many or too few calls made on one customer. By figuring your outside selling costs per call, you can tell the number of calls a salesman should make on a customer to keep it in a good profit position.

Inadequate customer service is another reason for low net profits. An industry which suffers heavy customer losses may be one which you are not equipped to service properly. You may have to change your methods of merchandising.

Order Quantities

A distribution cost analysis program can point out net profitability by size of order. This, too is valuable in further analyzing the profitability of your territories and customers. Low net profits here may be due to:

Need Retraining—Some salesmen may be going only after the big ones. By trying for a high average sale, at high cost of cultivation, gross-profit margins fall off.

Some salesmen may be just acting as order takers. They get many orders at a low average sale but at the expense of high paper and other handling costs.

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(Advertisement)

RBW FASTENER BRIEFS

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

Technical-ities

By John S. Davey

The choice between a cap screw and socket head screw

If you have the choice, make it a socket screw when you have a space problem, but choose the cap screw for more holding power per dollar.

No question that you should apply socket screws in counterbored holes; and that you can clear tight spaces. What you can't do is utilize the full strength of the alloy needed for the socket head. And remember, strength of a connection depends on how you preload the fasteners, and not on the strength of the fastener material alone.

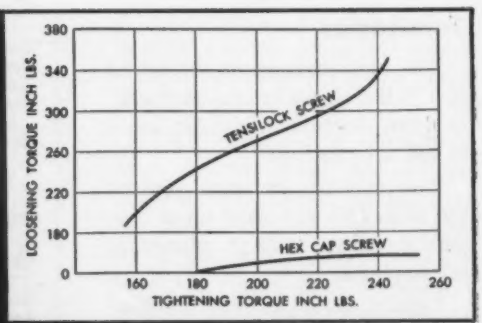
THE HANDICAPS OF ONE

Internal wrenching rarely develops as much torque as needed for proper preloading. And if high torque is developed, the smaller bearing area of the socket head tends to crush the surface on which it bears rather than increase tension or preload.

THE ADVANTAGES OF THE OTHER

If you design to take advantage of heat treated cap screws of SAE grade 5 quality, you'll get a stronger connection at lower cost. These standard fasteners have ample bearing and wrenching surfaces, can be torqued right up to yield strength. They also cost less than the alloy fasteners.

New TENSILOCK* Screws seat tighter, lock tighter



Graph shows example of on-torque and off-torque relationship. It takes more torque to loosen than to tighten.

RB&W's new TENSILOCK screws, the toothed fasteners with high tensile locking, are identified by six radial dashes on flange.

Head has integral washer face with teeth that lock fastener to surface. Circular groove allows flange to flex and seat to bear solidly on surface.

RB&W's TENSILOCK fasteners feature ratchet-like teeth formed at an angle which cuts driving effort yet which enables the teeth to bite in firmly and give an improved grip against back-off.

In addition, a circular groove in the integral "washer" permits the flange to flex upon tightening, and helps maintain tension in the fastener and pressure on the teeth.

IMPROVED TENSION TO TORQUE RATIO

With reduced friction under the head, the new tooth design has enabled more of the wrenching torque to be used to develop tension and less to overcome friction. Since the flange flexes, it allows the screw to bear solidly on its seat. All of the high strength capabilities of these heat-treated one-piece fasteners can now be attained for a stronger assembly.

MORE LOCKING POWER

Tensilock screws need up to 40% more off-torque than on-torque. Combining this feature with the higher residual tension, and the diaphragm action of the integral washer face, these fasteners give superior locking and holding power for permanently tight, strong joints . . . even under severe vibration and cyclic temperature changes.

Now available in limited range of screw types (not in flat head), and in various nut sizes. For details, write Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, New York.

* Trade Mark Pat. applied for.

Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. Additional sales offices at: Ardmore (Phila.), Pa., Pittsburgh; Detroit; Chicago; Dallas; San Francisco.

What's Ahead for Auto Output?

T-H Injunction Doesn't Solve Automaker's Problems

It depends on who you talk to as to how the fourth quarter stacks up.

But the overall picture isn't bright.

There just won't be enough steel made during the 80-day injunction to recoup losses.—By A. E. Fleming.

▪ Eighty days of steel production, under the Taft-Hartley injunction, is welcomed by the automobile industry.

But the cheers sound hollow when they ring through quiet assembly plants.

There is little to shout about at General Motors, for example. Most assembly operations have been down since late October. The last GM car that will be built for several weeks—a Chevrolet Corvair—left a factory in Willow Run, Mich., Nov. 11. There will be no more Chevrolets, Pontiacs, Oldsmobiles, Buicks or Cadillacs until mid-December. It will take that long before GM manufacturing plants get steel and are able to supply assembly lines with the components needed.

For Example—Buick is a case in point. The division's main plant in Flint made its last car Nov. 10. Workers are not expected to be recalled until Dec. 7. Production will start Dec. 14. All of the persons laid off because of the closedown will probably be back by Dec. 20.

Even when GM production resumes in December, it will not be for long unless a permanent steel settlement is reached. The country's biggest automaker will not be able to build up inventories in so short a time. It will scramble for steel. But cold-rolled sheets would likely be exhausted within 15 to 20 working days, at normal operating rates.

CLOSED: Steel stocks are gone, so the usually busy production line at the Pontiac Motor Div. assembly plant at Pontiac, Mich., is quiet. A half-finished chassis has its V-8 engine protected against dust until the company can get enough steel sheets to make its body.

January Crisis — This means more closedowns might be expected in January. Despite this possibility, a Chevrolet spokesman says production schedules will be accelerated as quickly as possible to levels prior to the shutdown.

Reports say some officials are opposed to such a speedy recovery, even though new car orders are flooding dealer showrooms. They want things slow and steady. Modified schedules, they say, will permit the best possible use of steel. This includes detailed planning for the variety of body styles that would most effectively satisfy customer orders.

How Ford Fares—Ford Motor Co. is in better shape than GM. Ford hopes it will get enough steel in time to avoid large-scale layoffs. At the beginning of November, most of Ford's 17 assembly plants went on three- and four-day weekly schedules. Now steel is on its way, Ford believes it can restore the five-

day week before the end of the month.

Chrysler Corp. is less fortunate. Several thousand employees have already been laid off. Work weeks are short. There is enough steel on hand to get by this week, perhaps next week. But further layoffs are sure.

The Best—American Motors and Studebaker-Packard are still in the best position. They will be able to bridge the production gap into January now that steel mills are operating. But there will be no overtime or six-day weeks.

AM is in a favored position because it invested large sums in conversion and premium steel. It also bought European steel. S-P made preparations last February for a steel inventory it hoped would carry through 1959. If it were not for Taft-Hartley, however, it would have run out Dec. 18.

Not so Good — The composite picture for the industry is not bright for November, December or even January. With GM on the shelf, and Ford and Chrysler moving at only part speed, industry output is expected to be about 250,000 cars this month. This is less than half of November 1958's 514,000 total.

The opposite was true in October. Last month's 507,000 cars almost doubled the same month a year earlier (261,000). However, GM plants were down last October because of auto contract strikes.

Insiders estimate the steel shortage will cut 500,000 units from calendar year 1959's new car sales. These would be added to the 1960 total. Original estimates for next year ranged between 6.5 and 7 million units.

Buick Holds Classes

It's back to school for more than 900 salaried Buick employees now that production has halted because of steel shortages.

Some 600 manufacturing supervision men in Flint are taking refresher courses in management development. More than 200 Buick zone office representatives are attending special product comparison meetings at GM training centers around the country. The remaining 100 students include district managers and other sales people.

The courses are designed to use the period of curtailed operations to help employes improve themselves and Buick products and services.

GMC Introduces Its New Trucks

GMC Truck & Coach Div of General Motors is introducing its 1960 models this week. Under the hoods of the new trucks are the industry's first V-6 and V-12 engines .

"These V-6 and Twin Six engines were designed exclusively for truck work," says P. J. Monaghan, division general manager. "They have the high torque needed to get big loads moving and the durability required to keep them rolling."

Long Life—Mr. Monaghan says the engines have life expectancy up to three times greater than existing designs. Another important factor: The various engines have many parts in common, enabling operators and dealers to reduce capital outlays for replacement engine parts stocks.

Most of GMC's light, medium and medium heavy-duty models will also use independent front spring suspension. It is used in conjunction with torision bar front springing. This eliminates the I-beam type axle in such models, as well as leaf springs, front and rear spring brackets, numerous grease fittings and a large frame cross member.

New Tank Contracts

Contracts for the new M-60 tank and M-88 tank retriever will be let on broadly competitive bidding, says the Army. Now assembly of the tank is handled entirely by Chrysler Corp. at Newark, Del. This has nettled Michigan congressmen who would like to see some of this business in their state.

The Bull of the Woods

ACCUSTOMED AS HE IS TO TOBACCO CHEWERS, THAT ACTUALLY AMAZES THE OLD BOY--THAT'S AN EXAMPLE OF NOT HOLDIN' YOUR TOBACCO WELL!
THAT'LL NEVER BE A NATIONAL PROBLEM--THE CRAVING DEMANDS MORE AN' MORE, BUT PEOPLE AIN'T GOT TH' CHEEK
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It takes 10,371 of the smallest cups to weigh a pound and they are 20% lighter than the ones formerly made from drawn steel. Each is precision die cast to a remarkable degree of uniformity and accuracy, despite the complex design.

Such extremely thin-wall sections—possible only with zinc die castings—**frequently eliminate competition from all other materials and production methods.** In addition, ZAMAK zinc die castings provide many more advantages —and all at lower cost.

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HORSE HEAD PRODUCTS®

When is "in-plant" salt bath heat treating justified

...and on what basis?

Looking over the metal fabricating industry today, you will find these facts increasingly evident:

. . . There is a steadily growing need for in-plant heat treating.

. . . Most manufacturers today require far more precise heat treating results than ever before.

. . . While improving the quality of their products, it is equally important for these manufacturers to reduce product costs . . . and in-plant salt bath heat treating, as proved beyond question in dozens of cases, offers worthwhile opportunities in both respects.

Here, for instance, is a Mid-West manufacturer* whose Ajax Salt Bath installation saved him $37,000 the first eight months—*after deducting operating costs and 20% annual equipment depreciation.* Time and labor reductions, elimination of rejects, reduction of costly finish grinding and similar factors accounted for the savings. The more precise work obtained was simply a "plus" factor on which it is difficult to place a cash value.

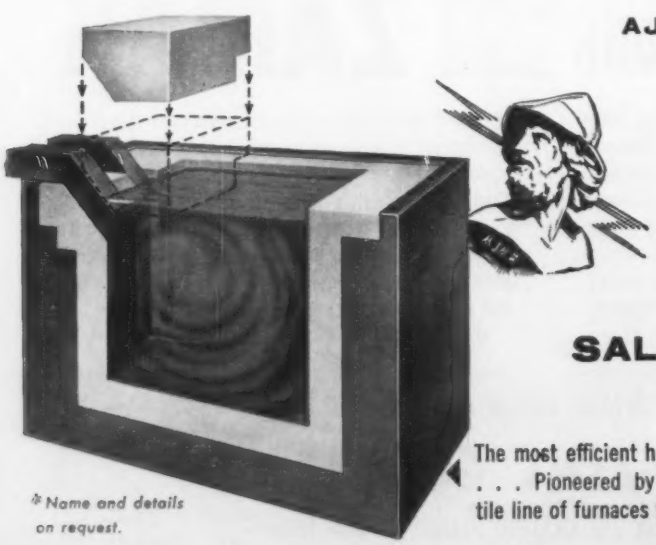
Originally bought for carburizing, this furnace is now used for brazing, hardening and simultaneous brazing-carburizing on many different parts.

Here again, is an Eastern electrical equipment plant* that justified its first Ajax Salt Bath Furnace solely because of its ability to assure ultra-precise, distortion-free hardening for critical thin steel plates.

First thing you know this furnace was also hardening, carburizing and brazing a lot of other jobs that suddenly appeared from other departments. A second Ajax installation has now been added—*in a plant where, less than two years ago, executives weren't even sure it would pay them to do their own heat treating.*

Perhaps these little case histories indicate that you too might investigate salt bath heat treating to advantage. If so, Ajax engineers welcome the opportunity to discuss things with you. Moreover, should such an installation seem feasible, they will demonstrate in advance of purchase and on your own production units in the Ajax Metallurgical Service Laboratories the exact results you will get.

AJAX ELECTRIC COMPANY
904 Frankford Ave.
Philadelphia 23, Pa.



* Name and details on request.

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The most efficient heat treating principle for most work . . . Pioneered by Ajax in the largest, most versatile line of furnaces for modern production requirements.

PIONEERS IN SALT BATH HEAT TREATING PROGRESS

Strike Stirs Congressional Wrath

Management Baiters Get Ready for Next Session

Management, particularly steel, will meet the old familiar faces, but with tougher proposals.

Mandatory arbitration is one of the possibilities that will be faced.—By G. H. Baker.

▪ Steel management is headed for more trouble with the government. The strike is responsible.

In both the Senate and the House, fresh attacks on the industry's labor relations policies are being prepared.

Critics of the industry are seizing upon the current delay in reaching a settlement as an excuse for bringing the industry under government control.

Administration, Too—The Eisenhower Administration, too, is preparing to kick the industry a few times for its "reluctance" to restore labor peace. ("Reluctance" is the government's word.)

The White House assault will be mild compared to the "cures" being brewed by Senators O'Mahoney and Kefauver, among other congressional critics of the steel industry. These antagonists would impose compulsory government arbitration upon steel management. This would mean, of course, government fixing of steel wages, and eventually of steel prices.

Be Prepared—It is not likely that the Congress will approve any such extreme plans. But the industry had better be prepared to meet, challenge, and defeat some of the "government should take over the industry" proposals that are to be raised early next year.

Also, the industry should plan now to offer some sound proposals of its own for improving labor-management relations.

The steel industry has come a long way in recent years in getting off the legislative hotseat and talking back to some of its political tormenters. Steel management took many painful shellackings in Washington before it wearied of turning the other cheek and started fighting.

What's Ahead — Basically, the strike remedies now being talked about in Washington revolve around three basic plans:

1. A law enforcing arbitration on the industry. Findings of arbitration boards would be final and binding.
2. Mandatory and early use of government fact-finding boards, with power to make recommendations. Some government officials believe that compulsory use of Federal fact-finders many months ago would have produced a peaceful settlement.
3. Making unions subject to the antitrust laws. A good argument can be made for such a law, but there are not enough votes in either the Senate or the House.

Congress Will Spend for Space

▪ Congress grows more sympathetic to space projects. Here and there, key Senate and House members hint they are in a mood to vote just about everything space-probers propose next year.

Should an election-year economy drive develop in 1960, it probably will not affect spending for missiles and projects designed to keep up with the U.S.S.R. in probing the universe.

Budget Time—Missile-men have not fared badly in their drive to coax dollars from the Congress. They've won approval of nearly all the projects they've proposed.

Right now, top military and space strategists are adding up their money requests for the year beginning July 1. The requests are due soon at the White House. After Ike's approval, the proposed budget will be sent to the Congress in January.

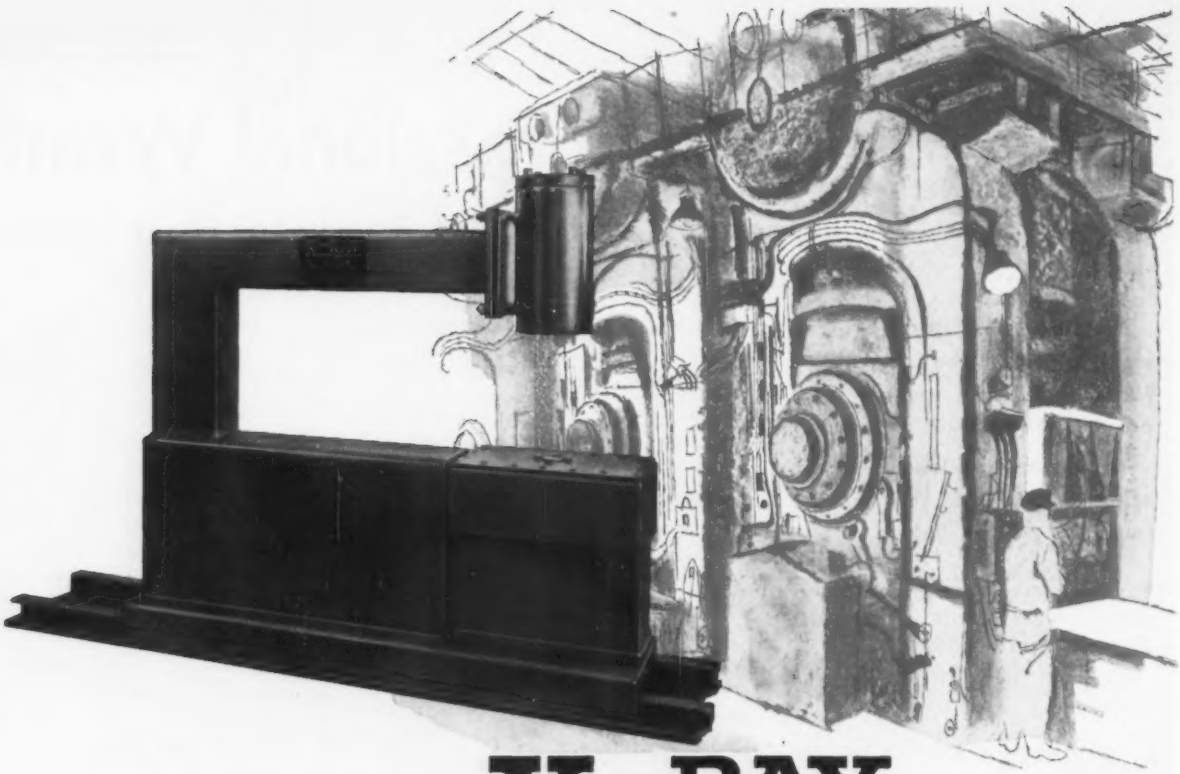
Senators Eager — Sen. Leverett Saltonstall, R., Mass., a member of the powerful Senate Appropriations Committee and the ranking Republican on the influential Senate Armed Services Committee, says: "It seems clear at this point" that Congress will not haggle over alloting funds for missiles and space in 1960.

"Nothing is more important to our national prestige and maintenance of peace," he declares. And Mr. Saltonstall is in a position to make his words stick.

And Sen. Richard B. Russell, D., Ga., chairman of the Armed Services Committee, predicts flatly that the Congress will vote as much money as is needed next year.

Sen. Russell, however, is disturbed over an intangible factor in the space picture: Public apathy.

"People don't show the concern they should," he says gloomily. "This is a dangerous condition."



NEW PULSED XACTRAY

cuts metal rolling costs 6 ways

XactRAY non-contact thickness gauges have a new look . . . and it's prompting smart metals men to take a new look at their cost balance sheets. Today's XactRAYs incorporate advanced components — such as pulsed X-ray sources greatly reduced in size and total radiation, and Weston's highly stable Vamistor® type resistors. At the same time, all the advantages which have earned XactRAY its high acceptance in the metals industry — such as absolute thickness calibration, unchanging for the life of the instrument — have been retained.

Whatever you roll . . . from foil to plate . . . ferrous, non-ferrous, or alloy . . . you'll find XactRAY can contribute dollar-savings to your operation.

- **SCRAP AND START-UP LOSSES ARE REDUCED**
  XactRAY offers faster response to thickness deviation than any competitive gauge. You can adjust a new run of strip to within tolerance in seconds. This response — together with automatic, absolute calibration—permits drastic reductions in start-up wastage and returned material.

- **CLOSER TOLERANCES CUT REJECTS . . . INCREASE CAPABILITIES**
  With XactRAY, it's possible to achieve tolerances as close as ± .000010". You can roll more premium-grade strip . . . or record thickness over every running inch in order to locate premium-grade sections. With automatic, continuous traversal mountings, XactRAY gives you edge-to-edge as well as end-to-end monitoring . . . helps control "crowning" deviations.

- **ROLLING SPEEDS CAN BE INCREASED**
  XactRAY's accuracy is independent of strip speed . . . it will gauge with equal precision metal moving at 6 or 6000 feet per second. Vertical movements of the strip don't affect accuracy either.

- **NO INTERFERENCE WITH YOUR PROCESS**
  The new XactRAY is so compact and requires so little maintenance that it can be installed almost anywhere on your line . . . for maximum efficiency and minimum interference. Many users operate XactRAYs deep within their mills — even close to hot rolls. A broad variety of mountings permits custom-fitting of gauge to equipment. Threading is facilitated by the wide gap between X-ray source and receiver.

- **MANPOWER IS RELEASED FOR PRODUCTIVE TASKS**
  Continuous XactRAY gauging, together with automatic controls and/or deviation alarms, requires only occasional monitoring. Cumbersome hand-miking is, of course, eliminated — with consequent savings in man-hours and mill-hours.

- **EASY INTEGRATION WITH CONTROLS**
  XactRAY integrates readily with existing or XactRAY-MATIC controls for economical "closed loop" regulation of thickness.

For full information, contact your local Daystrom-Weston representative . . . or write to Daystrom-Weston Sales Division, Newark 12, N. J. *In Canada: Daystrom Ltd., 840 Caledonia Rd., Toronto 19, Ont. Export: Daystrom Int'l., 100 Empire St., Newark 12, N. J.*

DAYSTROM WESTON *Industrial Gauges*

WORLD LEADERS IN MEASUREMENT AND CONTROL

How Farwest Keeps Expanding

Branches of Eastern Plants Add to Growth

Industry in Southern Calif. area keeps widening out to include new products and new services.

Eastern and Midwestern companies join scene by buying up local firms or starting new plants.—By R. R. Kay.

▪ New and expanding metalworking plants turn up almost every day in the Farwest.

It's a clear pattern. Most of the activity is in Southern California. These new products and services broaden the region's economic base.

Moving West — And more and more, old-line eastern and midwestern firms show up in the picture. They're putting their roots down in one of these ways: Buying up local firms. Expanding what they've got in the West. Starting a new plant from scratch.

Here's the story of growth in Southern California in a one month period. If you're looking for new business, a sales call on these companies might pay off.

New facilities started at these locations:

Saws, Motors, and Tools—The Stanley Works of New Britain, Conn., in Pico Rivera—hardware and tools. L. S. Starrett Co., Athol, Mass., in Los Angeles—instruments and saws.

Barber-Coleman Co., Rockford, Ill., in Monterey Park — machine tools, motors, instruments. Seaman Products, Evanston, Ill., in Sylmar —insulation parts for aircraft.

Arwood Precision Casting Corp., Huntington Park—castings. Interstate Coffee Corp. of Calif., Los Angeles—vending machines. Clay Smith Engineering, Long Beach—automotive camshafts.

Windows and Missiles—Illinois Tool Works, Chicago, in Hawthorne —fasteners and electrical rotary solenoids. Metal Window Corp., Inglewood — aluminum windows. AiResearch Mfg. Div. of Garrett Corp., Torrance—aircraft and missile components.

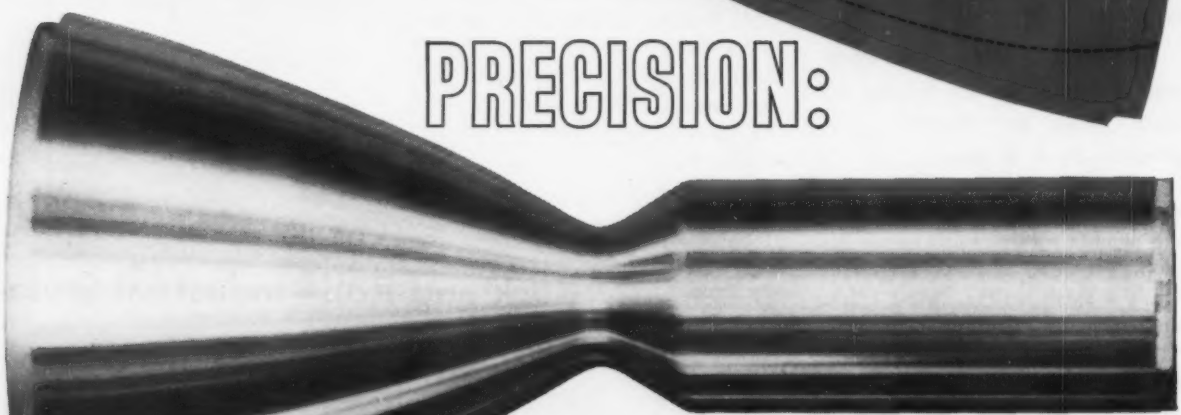
Carts, Coops, Electronics—North American Wire Works, City of Industry—chicken coop wire. Bug Engineering Co., Azusa—motorized carts. Litton Industries, Canoga Park—electronic equipment.

Advanced Systems Development Div. of Cleveland Pneumatic Industries, El Segundo—research and development in underwater ordnance,

Rock and Roll—Industrial Style

CENTRIFUGAL SPIN: "Eclipse" scene is created as hot enamel spray is applied to pipe rotated at 900 fpm. Pipe, fabricated by Napa, Calif., plant of Kaiser Steel Co., gets protective coating before going into service at electric generating station near Fresno, Calif.

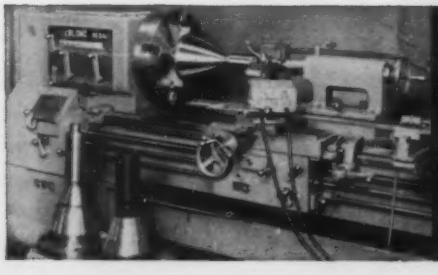
PRECISION:



Reason enough to buy LeBlond

In Hartford, Conn., Delta Corp. chucks a 350 lb. forging of 347 stainless in its tracer-equipped, 24″ LeBlond Regal Lathe. Delta is a specialist in precision sheet metal weldments and exacting machining jobs. When this job comes off the Regal it will be a contoured tube weighing only 18 lb. Its walls will vary in thickness from ⅛″ to 1/16″ according to a rigid and complex pattern. Wall thickness will be held to ±.003″; ID to —.001 +.000; OD to ±.008; and finish will be 20 to 30 rms. If the job is run 3 or 30 times, the same precise result will be achieved—reason enough to buy a LeBlond.

You never hesitate to put this kind of work on a LeBlond Lathe. You know that the sturdiness, the horsepower, the precision is there when you need it. It's what you'd expect from the world's largest builder of a complete line of lathes (and of tracers for lathes, too.)



THE R. K. LeBLOND MACHINE TOOL COMPANY
Cincinnati 8, Ohio

LeBLOND *of Cincinnati*

U.S. Draws More Foreign Tools

Foreign toolmakers are making a big pitch for U. S. markets.

They're coming up with new lines to compete with those made here, and are doing a good job.—By R. H. Eshelman.

▪ European toolmakers are starting to turn on the hard sell in American markets.

Each new U.S. trade show or exhibit includes some new foreign tools for sale to American buyers. Display booths use all the latest marketing gimmicks — including smiling hostesses to pass out literature.

New Entries — Machine tool companies in many countries—including Germany, Switzerland, France, Italy and England—have long been active in the American market. But now you can add these countries: Japan, Sweden, Netherlands, Austria, Belgium and Canada.

The recent Metal Show in Chicago highlighted this trend. And it also revealed some surprises in new machine design and features. But most impressive were the numbers of foreign tools, the varieties, and the price tags.

Canadian Influence—As usual, many of the distributors represent a variety of tools from here and there. But working a new avenue is the alert Canadian businessman who is moving into American markets from Toronto. He is the sole distributor of a unique two-ended sheet metal press. It will cut, notch, pierce, even form stock up to structural gages. On this compact machine you can shuttle parts through both ends at once. It takes minimum tooling; features a gear train encased in oil to cut noise.

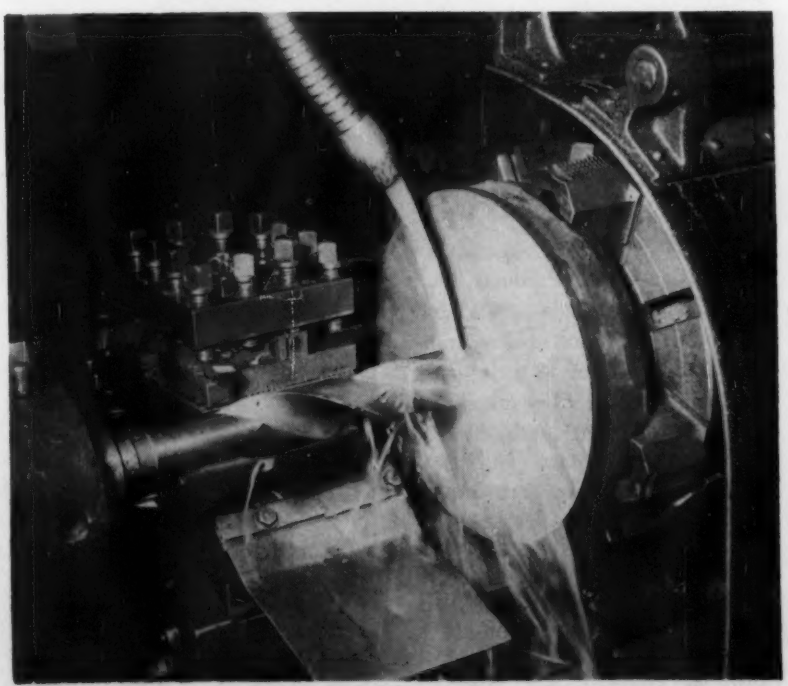
No denying it, such machines with no direct counterpart here may have definite appeal for some manufacturers. While European machines still exhibt fewer numerical controls, they stress precision with optical and other ingenious attachments. An example is a large optical jig borer of horizontal type that collects an eager audience whenever it operates.

Americans Buying—At the head of an aisle you find a rugged lathe billed as the world's fastest thread cutter. As an extra fillip there's a list of well-known American purchasers—including some of the nation's most respected machine tool firms.

Meanwhile, if our markets look lucrative from the outside, here's a switch. Many American firms are finding business is good abroad too. One small builder of special equipment is amazed that his continental plant—managed by a European-American—is picking up more business than the parent plant.

Forced Hand—More firms are joining this trend, giving the machine tool industry a new international flavor. Kirke W. Conner, board chairman of Micromatic Hone, says taxes, high wages and inflation have forced the industry to handle foreign goods. Companies wanting to stay in business have no choice, he says. The trend will be with us a long time.

Coolant Made for Better Viewing



KLEER-60: New, heavy-duty soluble oil was developed by Shear-Speed Chemical Products Div. of Michigan Tool Co. Oil is designed to give worker maximum clarity on drilling, cutting, and grinding operations.

INDUSTRIAL BRIEFS

Space Age—General Electric Co. will build a $14 million center for space technology research and development. It will be part of the company's Missile & Space Vehicle Dept. and will be located near Philadelphia.

Springing Up — Alco Products, Inc., is building a new wire-spring plant at Chicago Heights, Ill. It will have new production facilities and additional office space. The building, including its spring-producing equipment, will represent an investment of more than $500,000.

Joint Venture—American Zinc, Lead & Smelting Co. and Hydrometals, Inc., have formed a joint venture for the development and exploitation of the mineral resources and mining and milling facilities of the Peru Mining Co., Silver City, N. M. Peru Mining is a subsidiary of Hydrometals. Development work and drilling for ore reserves has begun.

R & D Service—A research and development service for companies seeking to develop new commercial processes is being offered by The M. W. Kellogg Co., New York. The service will be made on a cooperative, contract basis. They will provide data engineers need to design full-scale, commercial plants and to obtain research results.

Expansion—KSM Products, Inc., have established sales office and warehouse operations at San Francisco and Chicago. A new sales office will open at Milwaukee and an office has been established at Atlanta. New England and New York operations have been moved to Newark, N. J.

Pipeline — Air Reduction Sales Co. plans to build an air separation plant to pipe oxygen to the Tennessee Coal & Iron Div., U. S. Steel Corp., at Fairfield, Ala. Another plant for the production of atmospheric gases is being erected at Fairfield.

Steel Pails — Vulcan Containers Pacific, Inc., new West Coast metal container plant is in operation at San Leandro, Calif. The plant initially will produce steel pails in capacities ranging from 2½-6½ gal. and tinplate cans in a wide variety of sizes.

Under Way—Design has been completed and fabrication is proceeding in the Baltimore shops of the Koppers Co.'s Metal Products Div. on an electrostatic precipitator for the South Works of the U. S. Steel Corp., Chicago, Ill.

Campus Talk — The Hanson-Whitney Co., Hartford, Conn., has inaugurated a series of 3-day Distributor Training Sessions, to continue through June, 1960. The course will highlight advantages of all Hanson-Whitney products and their use in solving customer's problems.

New Facility — Frederic B. Stevens, Inc., has opened a warehouse and office in Indianapolis. The new location is located at 5345 Lexington Ave.

More Steel—Interprovincial Steel Corp., Ltd. will start a $1.3 million expansion program at its Regina, Sasks. works. Expansion includes a third electric furnace and widening of the plate mill equipment. It will increase production to 150,000 tons of finished steel a year.

"Can you give me a tentative date?"

Domesticity — Ano-Coil, color anodized aluminum strip in coil, will now be manufactured in the new Ano-Coil Corp. plant at Rockville, Conn. It was formerly available only from West Germany.

Bartering — Reynolds bauxite from Haiti will be delivered during the next year to a U. S. Government stockpile, in exchange for high protein wheat to be consumed by Caribbean Mills, Inc. in Haiti. The $6 to $6½ million barter committment was obtained by Reynolds Metals Co. from Commodity Credit Corp., Washington, D. C.

In the Midwest—Overly Mfg. Co., Greensburg, Pa., has opened a Midwestern subsidiary, Overly Mfg. Co. of Missouri, Inc. It is located at 105 W. Pacific Ave., Webster Groves, St. Louis 19, Mo.

On the Move—A foundry modernization program scaled to meet current and future production needs is underway at the Allis-Chalmers West Allis (Wis.) Works. The project will involve transfer of operations and equipment at No. 2 foundry to No. 1 foundry.

Groundbreaking—K S M Products, Inc., manufacturers of stud welding fasteners, equipment and accessories have broken ground for their new plant and office facilities in Moorestown, N. J. Manufacturing and executive offices will be headquartered in the Moorestown operation.

New Company — High Purity Metals, Inc., Hackensack, N. J., has been formed to specialize in the production of high purity raw materials. Facilities will include a complete refining plant and analytical laboratory.

Southern Headquarters—Air Reduction Sales Co. is building a $100,000 sales office and warehouse at 2300 South Boulevard, Charlotte, N. C. The building will serve as headquarters for the sales and technical service staffs. Occupancy will take place shortly after Jan. 1, 1960.

YOU GIVE YOUR DESIGN A LONGER LIFE WHEN YOUR "SPECS" READ HYATT

If you want smooth, trouble-free operation for the life of your design, you can have it with Hyatt! For Hyatt's built-in quality is electronically controlled to insure that the last Hyatt Hy-Roll bearing is just as accurate as the first. Hyatt reliability costs no more so why not have the best? Hyatt Bearings Division, General Motors Corporation, Harrison, N. J.

Available through United Motors System and its authorized bearing distributors.

HYATT *HY-ROLL BEARINGS*

IN ROLLER BEARINGS HYATT IS THE WORD FOR GM RELIABILITY

Forging Ohio Rolls

to shape metal for all Industry

. . . this 2,500 ton forging press, now in operation at the Lima plant, is the latest member of Ohio Steel's family of roll producing equipment.

The giant manipulator, overhead crane, and banks of the latest in car type, natural gas-fired furnaces, with automatic program controls, complete this new forging facility — A modern facility with which to produce Ohio Forged Steel Rolls.

The Ohio Steel Foundry Co.

LIMA, OHIO ... *Virtually at the center of the steel industry*

PLANTS AT LIMA AND SPRINGFIELD, OHIO

OHIO IRON AND STEEL ROLLS

Carbon Steel Rolls	Flintoff Rolls	Dense Iron Rolls
Ohioloy Rolls	Double-Pour Rolls	Nickel Grain Rolls
Ohioloy "K" Rolls	Chilled Iron Rolls	Special Iron Rolls
Nioloy Rolls	Forged Steel Rolls	

C. B. Jansen, elected chairman of the board and chief executive officer, Dravo Corp., Pittsburgh.

Johns-Manville Corp. — **C. B. Burnett,** elected president and chief operating officer.

Gates Rubber Co. — **C. H. Mingle,** elected executive vice president, marketing, Sales Divisions.

Tennessee Products & Chemical Corp.—**H. B. Myers,** elected a vice president.

Lee Wilson Engineering Co., Inc., Engineering Div.—**John Arnold,** promoted to manager, engineering and new products; **R. R. Hill,** named chief engineer; **R. J. Beemer,** named asst. chief engineer.

Clark Equipment Co., Brown Trailer Div.—**E. R. Baetzel,** appointed marketing manager, general sales marketing section.

Elliott Co.—**M. L. Hiller,** appointed asst. to the president.

Buffalo Forge Co.—**M. E. Reiner,** appointed treasurer; **G. P. Schivley,** elected to the board of directors.

Pittsburgh & Conneaut Dock Co. —**F. G. Moeller,** named asst to the general superintendent, Conneaut, O.

Morris Machine Works—**R. G. Humphrey,** promoted to manager, marketing; **Ingemar Dalstad,** named New York state district manager.

Crucible Steel Co. of America—**E. E. Cox,** appointed division superintendent, titanium, Midland, Pa., works.

H. K. Porter Co., Inc., Refractories Div.—**Howard Strandberg,** named New York district sales manager.

Eaton Manufacturing Co., Valve Div.—**H. M. Reigner,** appointed new products manager, Battle Creek, Mich.

The Garrett Corp., AiResearch Industrial Div.—**Jack Wright,** appointed asst. manager; **James Hardy,** named sales manager, and **Jack Marinick,** named controller.

W. E. Clark, elected president and chief operating officer, Dravo Corp., Pittsburgh.

M. A. Young & Co.—**Norman Ruderman,** appointed asst. manager, Chicago district office.

Pittsburgh Coke & Chemical Co., Activated Carbon Div.—**A. X. Hiltgen,** promoted to sales manager.

American Car & Foundry Div., ACF Industries, Inc.—**J. C. Cassidy,** appointed manager, product projects.

Allis-Chalmers Mfg. Co.—**W. L. Haslam,** appointed manager, chemi-

(Continued on P. 108)

C. F. Borden, appointed executive vice president, Kaiser Steel Corp.

M. E. Morgan, appointed vice president, Permaglas Div., A. O. Smith Corp.

J. E. Borchert, named corporate director, procurement, A. O. Smith Corp., Milwaukee.

QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866
THE WHELAND COMPANY
CHATTANOOGA 2, TENN.

(Continued from P. 107)

cal and metal sales, San Francisco district, and **Alan Purchasse,** named manager, industrial sales, Los Angeles district.

Houston Fearless Corp.—**J. N. MacDonald,** appointed manager, Contracts Dept.

Basic Inc.—**Cameron Sevier, Jr.,** appointed sales and service engineer, Cleveland, O.

Michigan Seamless Tube Co.—**E. A. Zywiec,** appointed chief engineer.

Gisholt Machine Co.—**H. S. Johnson,** executive vice president, has retired.

United Air Lines—**G. H. Reeder,** appointed superintendent, accounting methods and procedures.

The Abbott Ball Co. — **E. H. Berges Jr.,** named marketing manager.

International Business Machines Corp.—**W. R. Swett,** appointed director, manufacturing controls.

G. H. Weiss, appointed manager, pig and ingot sales, Aluminum Co. of America.

The Stanley Works—**J. H. Nichols,** appointed manager, Dallas office and warehouse.

The Torrington Mfg. Co., Machine Div.—**E. V. Collins,** appointed Cleveland sales representative.

U. S. Steel Corp., Columbia-Geneva Div.—**L. W. Roe,** appointed comptroller.

H. W. Brandt, promoted to vice president, The New York Air Brake Co.

Amchem Products, Inc. — **John Geyer,** promoted to technical asst. to the president; **Hugh Geham,** named manager, Products Development Dept., Metalworking Chemicals Div.

(Continued on P. 112)

How to get drier or cooler AIR or GASES
at low cost

NIAGARA *AERO* AFTER COOLER cools a compressed gas, or air, below the temperature of the surrounding atmosphere, thus preventing the condensation of moisture in your lines. The gas will contain only half of the moisture left in it by conventional methods. Even drier gas can be produced if you require it.

In working with controlled atmospheres of inert gases to prevent undesired reactions, this dryness of the gas at low cost is a great advantage. The cost of the Niagara method is low because it uses evaporative cooling, saving 95% of the cost of cooling water (and its piping and pumping). This direct saving of cost pays for the Niagara cooler in less than two years.

If you use compressed air to operate instruments or pneumatic equipment you will get better results by using the Niagara Aero After Cooler.

Write for Bulletin 130, or ask nearest Niagara Engineer if you have a problem involving the industrial use of air.

NIAGARA BLOWER COMPANY
Dept. IA-11, 405 Lexington Ave., New York 17, N. Y.
Niagara District Engineers in Principal Cities of U. S. and Canada

Automatic Transmission Manufacturer Specifies

Annealing furnace at the Shelby mill. Ostuco tubing can be bright or soft annealed, stress relieved, normalized or heat treated.

"As a leading producer of quality transmission components, we can't leave anything to chance. Our design requirements, materials specifications and manufacturing processes are under the most stringent quality control standards. And we demand as much of our vendors.

"One sure way we have found to eliminate the unpredictable is to specify Ostuco Seamless Tubing. We know from experience we can rely on the precision annealing and unvarying quality of Ostuco tubing that slashes reject rates, helps us produce parts in quantity for profit . . ."

If you want to eliminate the unpredictable in your own plant, then it's time you called your local Ohio Seamless representative. He's listed in the Yellow Pages. Or contact the plant at *Shelby, Ohio —Birthplace of the Seamless Steel Tube Industry in America.*

A.A.-9004

OSTUCO SHELBY OHIO — OSTUCO TUBING

OHIO SEAMLESS TUBE DIVISION

of Copperweld Steel Company • SHELBY, OHIO

Seamless and Electric Resistance Welded Steel Tubing • Fabricating and Forging

SALES OFFICES: Birmingham, Charlotte, Chicago (Oak Park), Cleveland, Dayton, Denver, Detroit (Huntington Woods), Houston, Los Angeles (Lynwood), Miami, Moline, New Orleans (Chalmette), New York, North Kansas City, Philadelphia (Wynnewood), Pittsburgh, Rochester, St. Louis, St. Paul, Salt Lake City, Seattle, Tulsa, Wichita. CANADA: Railway & Power Engr. Corp., Ltd. EXPORT: Copperweld Steel International Company, 225 Broadway, New York 7, New York

Large numbers of Steelweld Mechanical Press Brakes are in operation in the United States and throughout the world. This machine is rated for 8' x ¾", but has 12'-0" bed and ram. Sizes available to 2000 tons for forming lengths to 30 feet.

STEELWELD Mechanical Press Brakes
Catalog No. 2023

STEELWELD MECHANICAL and

Each Line Quality Built

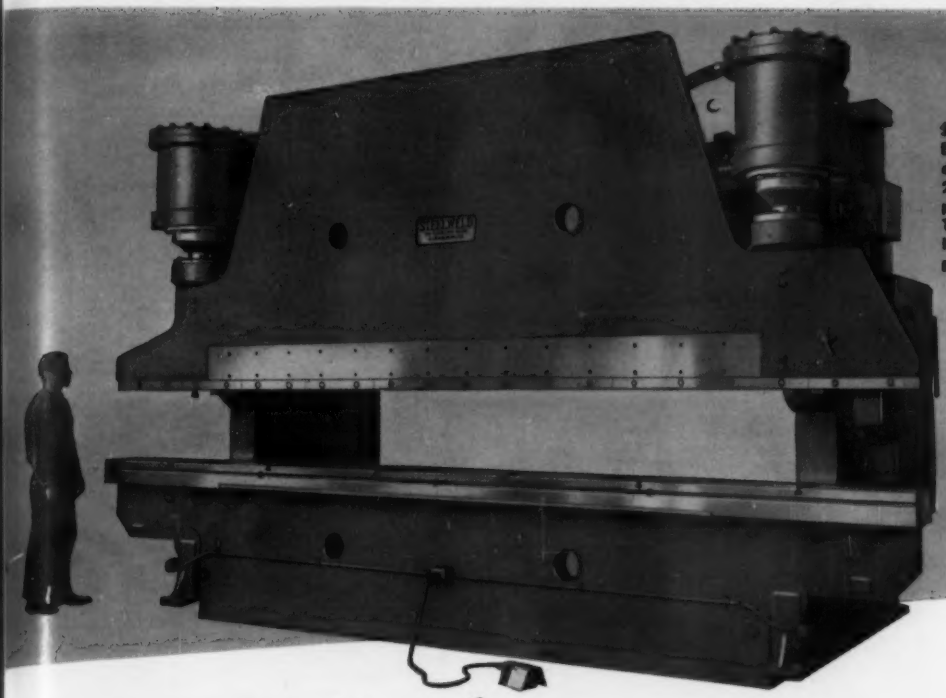
The smooth operation of Steelweld Mechanical Shears with exclusive pivoted-blade has proven a tremendous advantage to a great list of users. This shear is rated 10'-0" x ¾". Others available for plate to 30 ft. and thicknesses to 2 inches.

STEELWELD Mechanical Pivoted-Blade Shears
Catalog No. 2011

For Nearly 30 Years STEELWELD Has Been a Leading Name in Metalworking Machinery.

These FREE catalogs give you complete details.

Write or phone for catalogs desired, and we will rush them to you.



Steelweld Hydraulic Press Brakes are available in capacities from 200 to 2000 tons for working plate in lengths to 30 feet. The picture is of a 500 ton brake that will form steel plate up to 20' x 5/16".

STEELWELD Hydraulic Press Brakes
Catalog No. 2024

Offers Complete Lines of

HYDRAULIC PRESS BRAKES and SHEARS

for Long Life, Ease of Operation and Finest Performance

Steelweld Hydraulic Shears have two remarkable features not available on any competitive machine: Single-cylinder drive and pivoted-blade cutting action. The shear shown here handles plate to 12' x ½". Other sizes go to 30 feet and for plate thicknesses to 2 inches.

STEELWELD Hydraulic Pivoted-Blade Shears
Catalog No. 2030

STEELWELD
Mechanical and Hydraulic BRAKES and SHEARS

STEELWELD MACHINERY DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
4870 EAST 281 STREET, WICKLIFFE, OHIO

STEELWELD Machinery also includes One-, Two- and Four-Point Straight-Side Presses and Speed-Draw Presses.

CUTS INSPECTION TIME 75%

BAUSCH & LOMB

DR-25

OPTICAL GAGE

- DIRECT SCALE READING TO .0001"
- 0" TO 3" RANGE WITHOUT GAGE BLOCKS

"The new Bausch & Lomb DR-25 Optical Gage has let us cut total inspection and measurement time on our Teledyne Electrical Transmitters—high-precision gages to register and relay pressure data for telemetric readings—by at least 75%. We find that we no longer need gage blocks and special gages to meet our very rigid specifications."

Joseph F. Less, Plant Manager
Taber Instrument Corporation
North Tonawanda, N. Y.

Distributed in the U.S.A. through the DoALL Co.

BAUSCH & LOMB OPTICAL CO.
85247 Bausch St., Rochester 2, N. Y.

☐ I'd like an on-the-job demonstration of a B&L DR-25 Optical Gage. No cost, no obligation.

☐ Please send Catalog D-285.

Name, Title .....

Company .....

Address .....

City ..... Zone ..... State .....

Find out more about cutting inspection time and costs... MAIL COUPON TODAY

BAUSCH & LOMB

(Continued from P. 108)

The New York Air Brake Co., Hydreco Div.—**W. G. Jarvis,** promoted to manager, quality control.

N. R. Brownyer, named director, research and development, all divisions and subsidiaries of Rockwell-Standard Corp.

L. A. Harrison, appointed general sales manager, National Div., Kaiser Refractories & Chemicals, Pittsburgh, Pa.

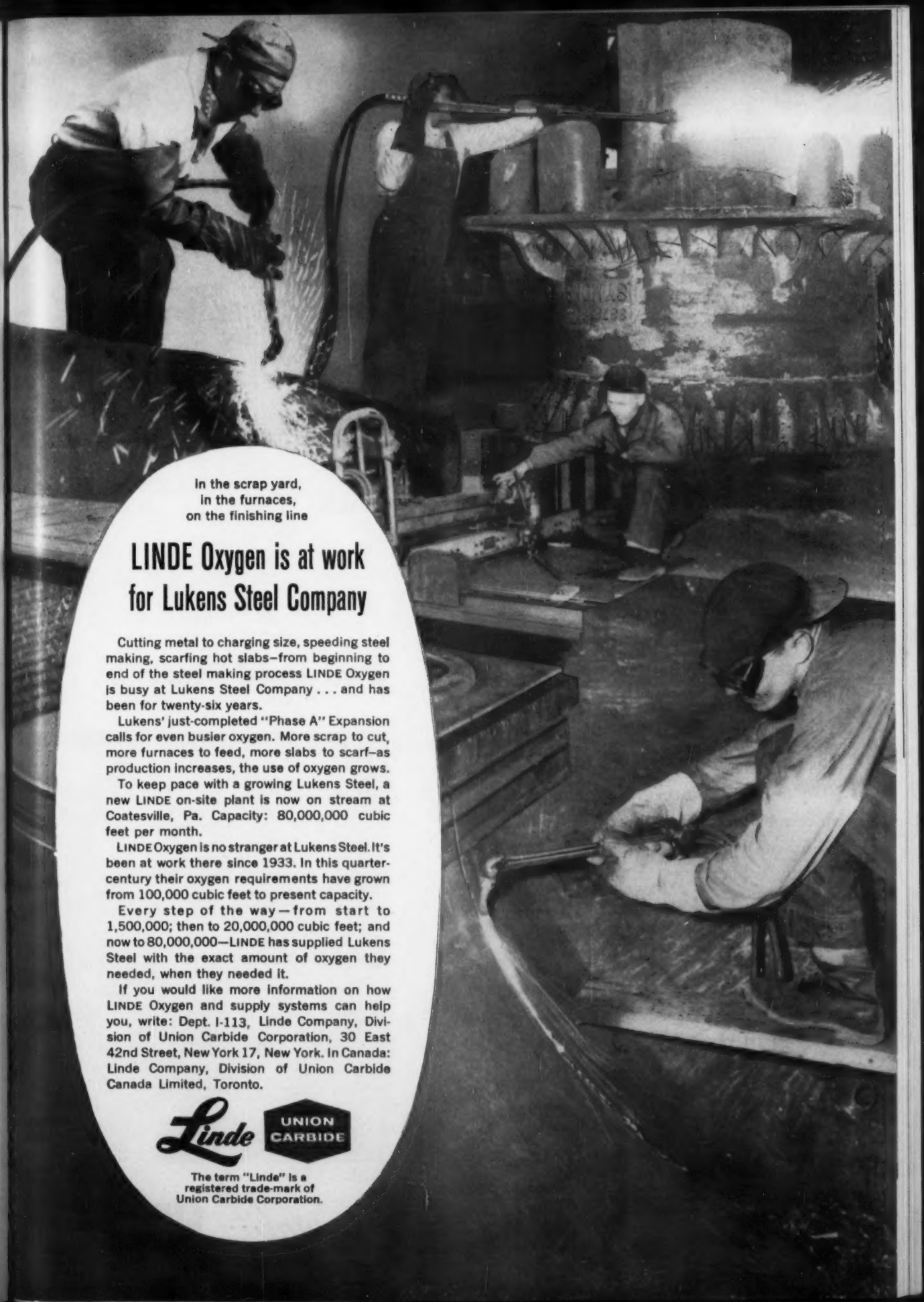
OBITUARIES

C. J. Weber, president and co-founder, Chicago Gear Mfg. Co.

H. E. Smith, 70, retired vice president, rubber products sales, Raybestos-Manhattan, Inc.

C. B. Pollock, 64, vice president, manufacturing planning and policy, Allegheny Ludlum Steel Corp.

W. J. Temple, works manager, K O Steel Castings, Inc., San Antonio, Texas.



In the scrap yard,
in the furnaces,
on the finishing line

LINDE Oxygen is at work for Lukens Steel Company

Cutting metal to charging size, speeding steel making, scarfing hot slabs—from beginning to end of the steel making process LINDE Oxygen is busy at Lukens Steel Company . . . and has been for twenty-six years.

Lukens' just-completed "Phase A" Expansion calls for even busier oxygen. More scrap to cut, more furnaces to feed, more slabs to scarf—as production increases, the use of oxygen grows.

To keep pace with a growing Lukens Steel, a new LINDE on-site plant is now on stream at Coatesville, Pa. Capacity: 80,000,000 cubic feet per month.

LINDE Oxygen is no stranger at Lukens Steel. It's been at work there since 1933. In this quarter-century their oxygen requirements have grown from 100,000 cubic feet to present capacity.

Every step of the way—from start to 1,500,000; then to 20,000,000 cubic feet; and now to 80,000,000—LINDE has supplied Lukens Steel with the exact amount of oxygen they needed, when they needed it.

If you would like more information on how LINDE Oxygen and supply systems can help you, write: Dept. I-113, Linde Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, New York. In Canada: Linde Company, Division of Union Carbide Canada Limited, Toronto.

Linde UNION CARBIDE

The term "Linde" is a registered trade-mark of Union Carbide Corporation.

In 1946 J. Gordon Lippincott and Walter Margulies began what has proved to be one of the nation's most successful industrial design firms. Here their firm has chosen the new, exciting patterns of Sharonart* as the material for their advanced design room air conditioners.

Eliminating the conventional box-like unit Lippincott & Margulies have taken advantage of the principle of thermoelectric refrigeration and the beauty of Sharonart* to design units that are both attractive and functional. Fans, housed in the base or back of these units, force air over the cooling elements and circulate it throughout the room. Housings of perforated and painted or plated Sharonart* give the units added beauty while practically eliminating wear.

Tomorrow's room air conditioners designed by Lippincott and Margulies with

SHARONART*

Patterned Steel

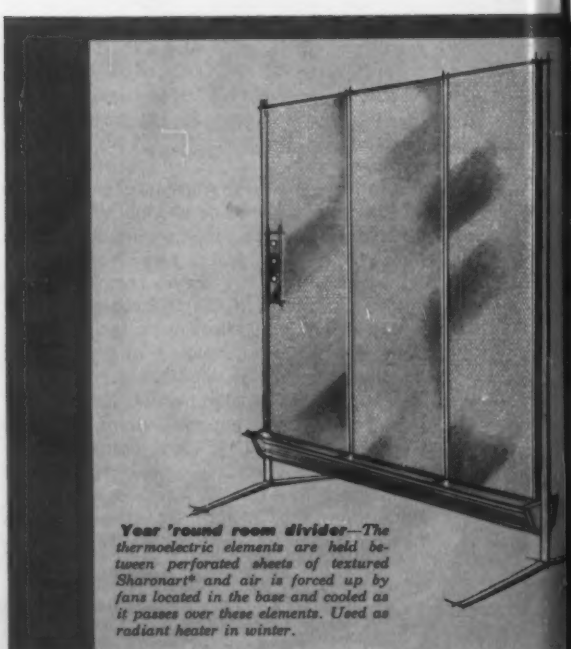
Sharonart* . . . the greatest advance in design steels in a decade . . . brings unequalled versatility to product engineers. Virtually any pattern can be rolled into one or both surfaces of stainless or carbon steels. It can then be fabricated as easily as plain steel . . . perforated, drawn, roll formed, stamped with few limitations. It can be painted, plated or coated by standard methods.

Here's new beauty, new style for your product without expensive retooling. Here's the ideal material for wear areas for most Sharonart* patterns hide scratches, fingermarks, etc.

Sharonart* is available in big production coils in a wide range of gauges and widths. Get the complete story, write for literature today.

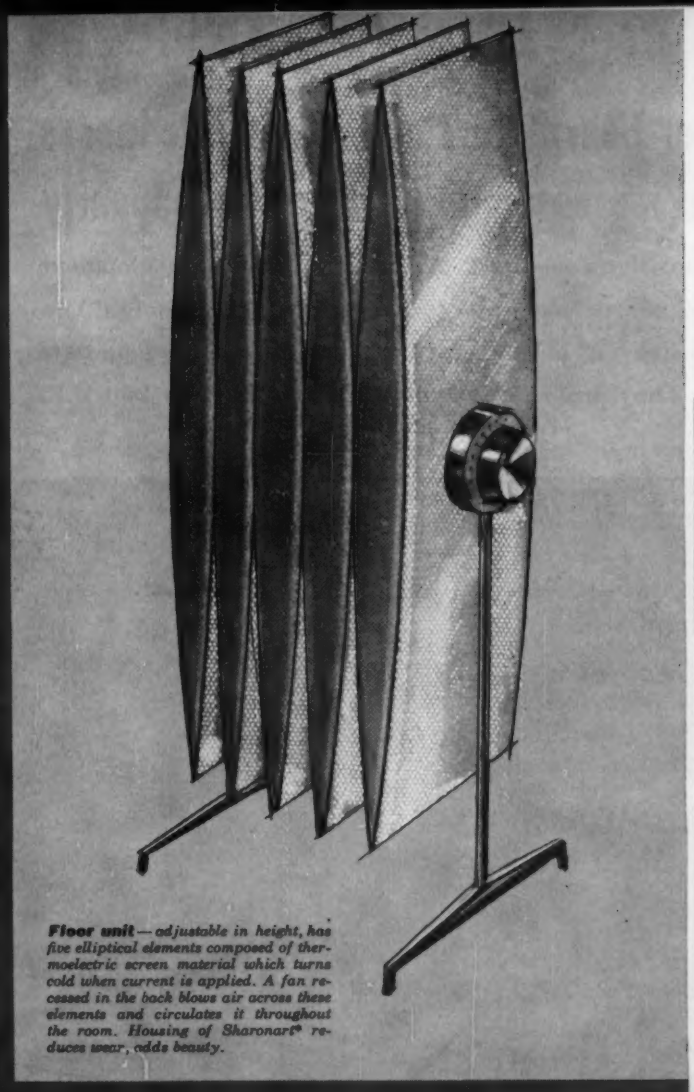
Sharon Steel Corporation, Sharon, Pa.

*TM

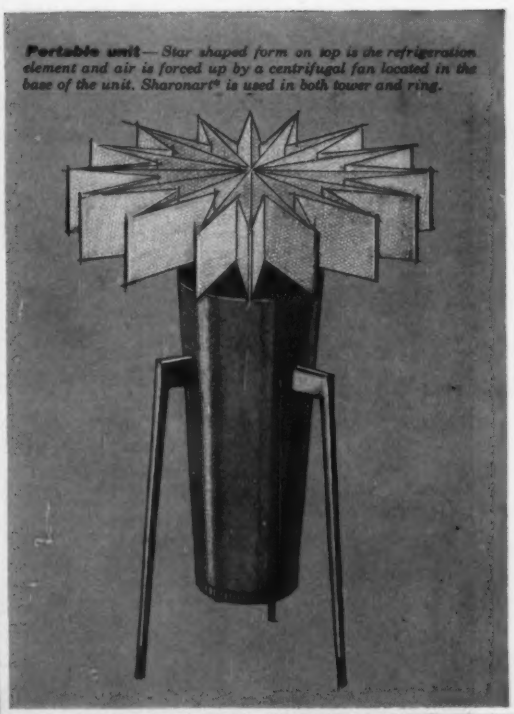


***Year 'round room divider**—The thermoelectric elements are held between perforated sheets of textured Sharonart* and air is forced up by fans located in the base and cooled as it passes over these elements. Used as radiant heater in winter.*

SHARONSTEEL **SHARON** *Quality* **STEEL**

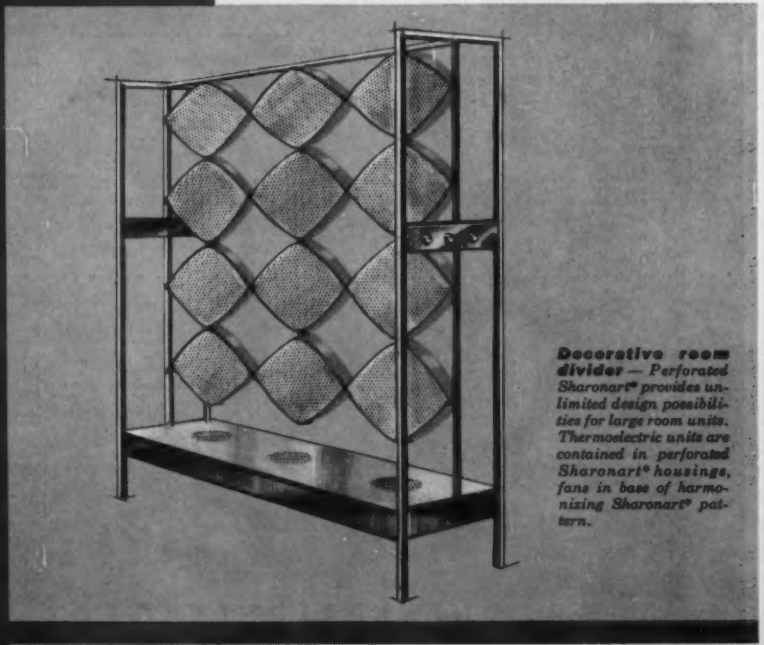


Floor unit—*adjustable in height, has five elliptical elements composed of thermoelectric screen material which turns cold when current is applied. A fan recessed in the back blows air across these elements and circulates it throughout the room. Housing of Sharonart® reduces wear, adds beauty.*



Portable unit—*Star shaped form on top is the refrigeration element and air is forced up by a centrifugal fan located in the base of the unit. Sharonart® is used in both tower and ring.*

...ble unit—*The upper half is made up of a thermoelectric ...ment and air is blown up and through by a centrifugal ... mounted in the base. A removable pan is provided to ...ct any moisture which may form on the sides. Fins and ... of contrasting patterns of Sharonart®.*



Decorative room divider—*Perforated Sharonart® provides unlimited design possibilities for large room units. Thermoelectric units are contained in perforated Sharonart® housings, fans in base of harmonizing Sharonart® pattern.*

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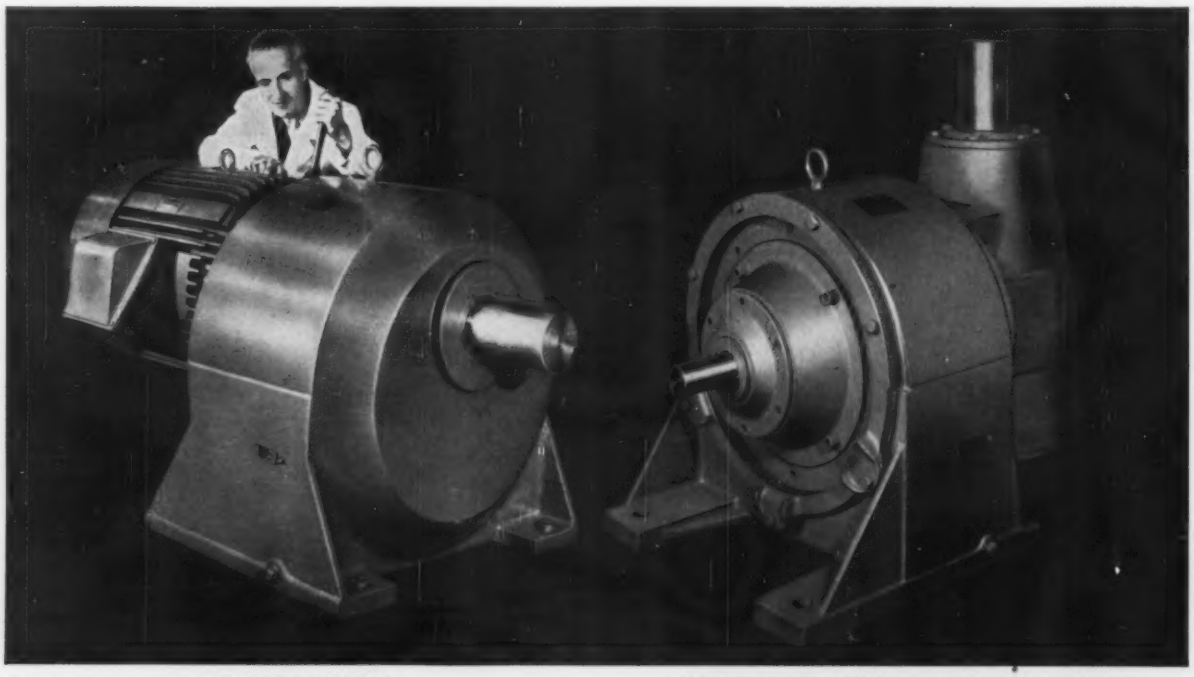
The gearing in these drives is case hardened and precision ground, a development so advanced that conventional standards and ratings are suddenly out-of-date. You get commercial gear drives with gearing of master gear quality, plus a whole new set of engineering advantages. They are available in standard sizes to 200 H.P.



(Left) 75-HP GEARMOTOR.
Application: heavy duty machine tool drive.

(Right) 50-HP IN-LINE REDUCER with right angle attachment.
Application: conveyor drive.

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Extreme accuracy of tooth profiles, profile spacing and surface finish eliminates "running in" and resulting gear wear.

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Dynamic load factors are reduced. Reducers operate at higher speeds, have increased load carrying capacity.

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How Value Analysis Promotes Better Product Acceptance

Why over-design? All the end user wants is performance.

Give your own work-force the job of frill-cutting. But it takes a real system to put it into practice.

By R. H. Eshelman—
Machinery Editor

▪ How can you give your customer more value for his money? That's a basic problem for metalworking firms—and its employees—if they want to grow and prosper.

Companies that fail to do so go out of business sooner or later. Building better products at lower cost is simply a matter of corporate survival in today's competitive market.

Aimed at this goal are a wide variety of programs: management control, value analysis, cost reduction, quality control, work simplification, and operations research.

All are good in themselves. Their effectiveness, however, can only be measured by the support they win from the entire organization.

What Function?—As D. L. Heisler, corporate procurement manager of Whirlpool Corp., St. Joseph, Mich., puts it: "We feel that a product-value program must cover every phase of the product's design, development and marketing.

"This concept includes the whole corporation. You can't distill it out and put it into one department. But it does need a focal point."

He explains the purpose of Whirlpool's effort simply as a systematic way of making sure that the customer is getting the maximum value for his dollar. With this thinking, you start with your customer as your reason for being. You ask "What functions are we selling the customer?"

The customer, Mr. Heisler explains, isn't at all interested in chunks of metal, plastics or paint. He's looking at what the product or device can do for him—convenience, beauty and service for the price.

To set up a product-value program, you must cut across departmental lines. You must get people to challenge every facet of cost development in the product. That includes design, material manufacturing cost, tooling, packaging and transportation.

Broaden Participation—First efforts at Whirlpool started in cost reduction committees for each product. The groups included members from departments most concerned. Their purpose was to discuss costly areas of processing.

They would hammer out cost saving improvements and present them to the departments for action. It was an effective program as far as it went. But it restricted idea generation.

To widen the scope, they changed direction of the program. Its new purpose is to stimulate cost

PRODUCT DISPLAY: By setting up a washer-dryer, employees can study the major components in detail. The displayed unit, without cover, prompts design ideas from company workers as well as outside suppliers.

reduction ideas in the division. A cost reduction team not only develops these promotional programs, it also processes the newly-required ideas.

Organization Effort—This new approach has a pyramiding effect. It brings out many more ideas, and it also makes the divisions more cost conscious. To broaden the scope of participation, the team uses several proven techniques.

One is a parts display. They choose a large, centrally-located room for the layout of component parts making up the finished product. Parts are mounted with their major subassembly, giving a live "exploded view."

Groups from all departments of the division meet with a member of the team and a qualified engineer. Typical result of a one-week meeting with 300 people is 600 suggestions.

Other Programs — Another system makes use of the spirit of competition. The division is split into 10 teams. Publicity acquaints everyone of the program's aims and rules. Results for a six-week contest were 450 acceptable suggestions.

Another technique is termed "operation cost research." This consists of organizing brain-storming teams for each staff and production department.

The department head appoints the team chairman. Each team comprises six or more men, with at least one representative from engineering, tooling, purchasing, inspection and cost or planning.

Looked Them Over—One such program was aimed at the combination washer-dryer. A stripped-down machine was exhibited in every major department. In two weeks, more than 2600 cost reduction ideas came in from the teams.

Of these, 772 were practical suggestions. As a result, the division achieved a reduction of unit cost of some 3.2 pct.

Include Suppliers—It's apparent now that this effort has reaped its largest payoff. The program within the company now centers more on cost consciousness in planning stages. This means cooperation between design engineering, tooling, and manufacturing.

One division may manufacture some $15 million worth of products in a year. But in the same year, the division buys $50 million, including tooling as well as parts.

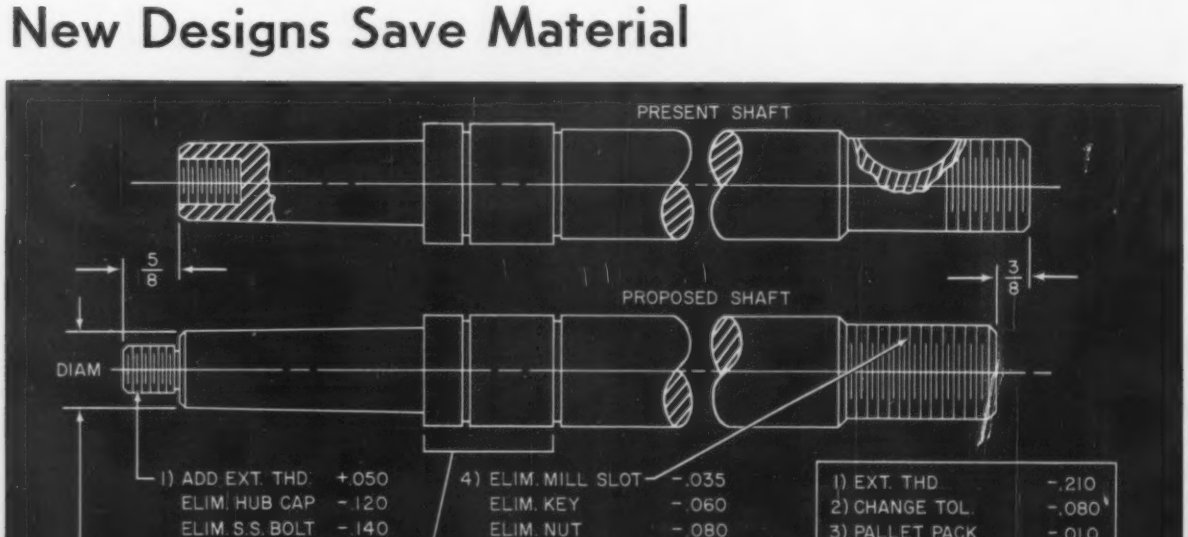
Those Who Buy—Purchasing is really the crossroad of the company's activities. It's the efficiency in this area that determines the company's success or failure.

This new role of purchasing extends product-value thinking. It also insures that the many parts made by outside sources represent optimum value and function.

Value Buying—This phase of the program requires much tact and diplomacy. Suppliers need to be convinced the effort is one of mutual benefit.

D. F. Upton, Director of Purchasing of the St. Joseph Division, explains, "When we began to apply value reasoning to purchased parts and assemblies, we were surprised to find suppliers often only had vague ideas of the functions of what they were making . . . we were not

New Designs Save Material



making full use of their tremendous talents."

Suppliers Can Help—He points out that their experience shows you need to work closely with suppliers. "Tell them just what your plans are, what you expect to have in design and how you can expect to utilize their special skills."

The wider open your book is to your supplier and the greater the mutual confidence, the better the results. That's value buying.

To Smooth Things Out—They needed someone to organize the program, and to coordinate design engineering, purchasing and supplier's technical needs. So a cost-reduction expert, Linn Tellander, was brought in.

One of the first steps was value buying training for the purchasing group, to orient their thinking. This points up that a failure on the assembly line, traced back to a vendor, is simply a purchasing failure a year or two ago.

Sensible Buying—Many of the same techniques apply. For instance, the display-suggestion session is particularly effective. These involve suppliers engineers, shop executives or other technical people.

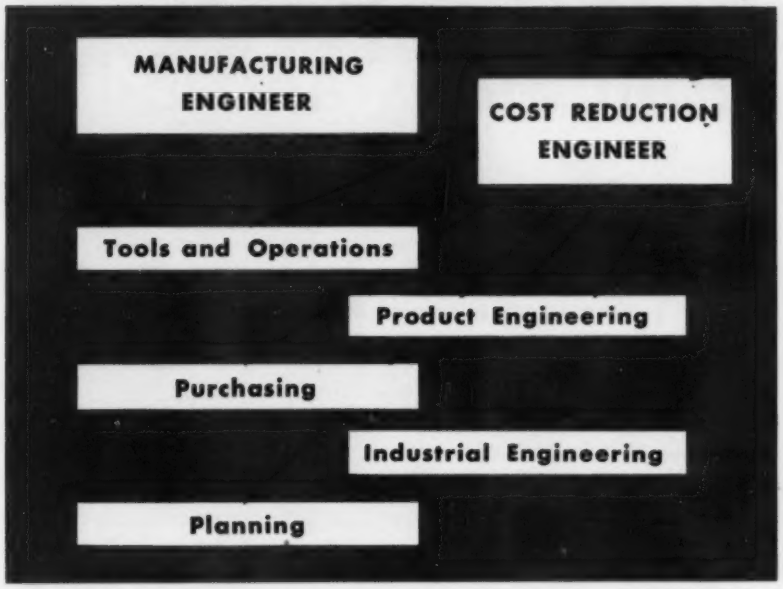
According to Mr. Tellander function is the basis of all value buying. "We look at the part first—what function does this thing perform and how can we perform this function in a different and more economical way?"

Watch Tolerances—Often tolerances are the most critical factors. In relation to cost, does a specific tolerance really contribute to the function you want? For instance, take the wall thickness specified for a gear housing. Tendency is to make it heavy. Perhaps it's strong enough to perform its function for a hundred years.

Yet the gears in the case are only good for 15 years. So what is the point of the extra material in the housing? Your help can obtain a more sensible thickness at less cost.

The responsibility in procurement planning at the St. Joseph Div., then, is to look at the part design with the supplier. Look at typical diecast or plastics parts in preliminary design. You must consider tolerances, wall thicknesses and material traits.

How the Team Lines Up



REDUCES COSTS: New ideas on design are liable to come from almost any group. After the unit is built, everyone gets a final look.

Study These Areas—With a 15 to 20 pct scrap allowance to report to designers, you can make definite engineering accommodations. Maybe you can change another mating part dimension that is less critical. Or even set up a statistical control or selective assembly.

The display conference may reveal that a heavy wall on a diecast part means warpage. This requires added machining. And these are things the supplier's production experts can predict.

They can put a dollar sign on wall thickness, too. The thick wall may slow down diecasting cycle time to 100 pieces per hour. That's because the part must cool in the die longer than normal to hold down warpage. Thin out the web and you can get 150 pieces per hour.

Too Much Grinding?—Consider the cost and value of something as simple as a part finish. On a machined part, too fine a finish may mean the difference between two and three grinds.

So ask the supplier: what tolerance can you hold with two or even three grinds? How much would each operation cost? Then the engineer, looking at these data, can evaluate the specs.

How much money does he want to put into this part, and how much quality is really needed?

Better Approach—This program takes a new direction. Obviously emphasis is more on cost control. The goal is to take the preliminary design as proposed by engineering. Go over this with the vendor's engineers.

Question any part made the same way today as it was five years ago. Chances are that anything that has remained static that long is now obsolete.

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Hydraulic Spray Frees Scale From Slabs and Billets

By R. K. Grobholz—Worthington Corp. Oil City Div., Oil City, Pa.

Mill tooling often puts up with all sorts of unnecessary punishment. A little thought can make it last longer.

The answer is right under your nose: water. Sent through the right system, it can add months to equipment life.

■ The presence of scale on steel surfaces during hot forming operations causes more problems than meets the eye. The abrasive action of scale shortens the life of rolls or forging dies. Also, cutting tools wear out quickly during machining.

But high-pressure jets of cool water create a shrinkage that loosens the scale from the steel surface. And this can be done with an impact force of 1000 psi.

Key to the success of the hydraulic setup is the spray nozzle. Delivering a 7-in. wide fan-shaped pattern, each nozzle operates about 12 in. from the slab or billet. You can position several nozzles to cover any width slab.

Descales Both Sides—If needed, you can even descale both sides of a slab. Spray nozzles can also hit all four sides or the complete diameter of a billet. Worthington Corp., Harrison, N. J., makes three basic nozzles. Their orifices range from 1/32 in. to 1/16 x ½ in. in size.

A pioneer named Holveck devised a method to measure the effect of descaling. He called it a "G value." In other words, the gallons per minute of water to hit each inch of slab surface width. According to the formula, you get best results when the "G value" falls between 4 to 6.5.

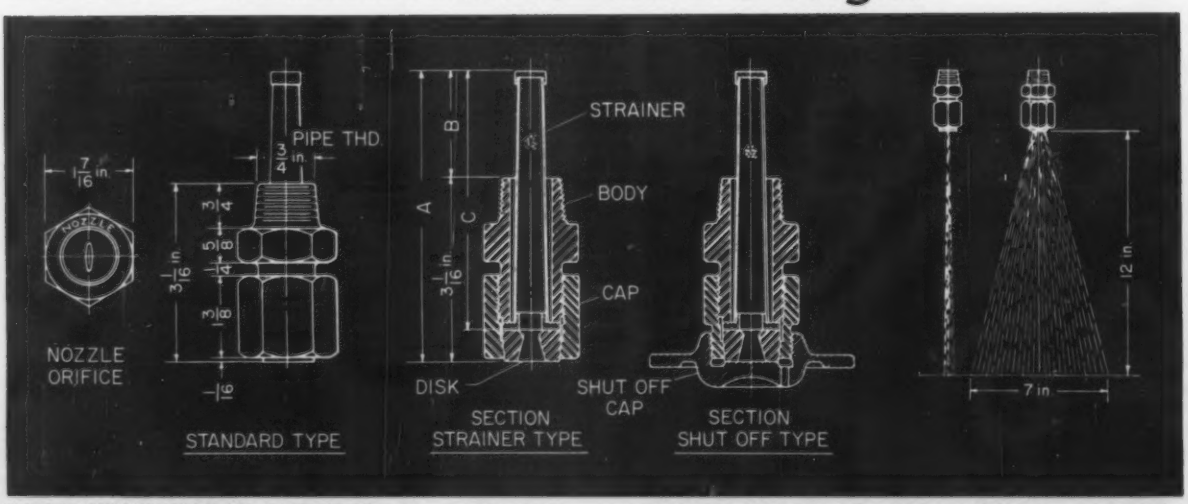
Scale Types—Most scale takes on two common forms. Primary or furnace scale forms during heating. Poor control of furnace atmospheres causes such a condition. This scale is evident on heated slabs as soon as they emerge from the furnace.

Of course, this is the logical point to remove the scale, before the steel undergoes further processing.

Secondary scale forms during shaping from contact with the atmosphere. Whether secondary scale is more tenacious than furnace scale is an academic question. But one thing is certain. It's almost impossible to descale slabs or billets reheated for the second time.

For Rolling Operations — The continuous strip mill can make good use of descaling in its rolling operations. Here, 1200 psi pressure is enough for descaling carbon steels. Alloys require higher pressures, within the range of 1600 to 1800 psi.

Nozzles Fall into Three Basic Designs



INTERCHANGEABLE PATTERN: The same spray pattern is used for standard or shut-off nozzles. You get best results by keeping nozzle 12 in. from the work. The spray should cover a 7-in. area.

To do a thorough job, it's necessary to repeat jets at a number of locations. But make sure that the jets hit the slab right after it emerges from the furnace and before it reaches the first set of rolls.

Some experts suggest the placement of added spray stations just beyond the edgers. The side "squeeze" of edging rolls tends to loosen scale, easing its removal.

Watch Water Levels—To conserve water, it's a good idea to install an automatic system to control the spray valves. You can set your spray timing to coincide with three basic mill cycles.

First, note the lapse of time between slabs. Next, see how long it takes to pass each different spray location. And, third, gage the length of time required for a single slab to pass from each spray location to the next.

Use in Strip Mill—A rundown of the setup in a typical continuous strip mill sheds further light on the subject. Suppose the mill rolls 60-in. wide slabs every 50 seconds. Then ten properly-positioned nozzles will provide a 63¼-in. spray width.

But to provide this coverage, the nozzles must be 12 in. from the slab and 6¼ in. apart. Spacing between nozzles permits a ¾ in. overlap between adjacent sprays.

Applying the Formula—Harking back to Holveck's formula, see how it applies in this same setup. Assume that this grade of steel favors a nozzle pressure of at least 1350 psi. A 1/16 x ½ in. nozzle at this pressure passes 40 gpm.

To find the "G value," multiply this last figure, 40, by the number of nozzles in the bank—in this case, 10. Then divide this total by the spray width: 63.25. Your answer will be 6.3 gpm/in., well within the maximum limit of 6.5.

But bear in mind that average pressures at the nozzles are higher than 1350 psi if your plant uses an accumulator. In fact, it's a good idea to boost pressures to 1500 psi when that's the case.

Wartime Demands—Probably the biggest recent installations for billet descaling were in use during World War II and Korean conflict. Some of these plants formed up to 10,000 shells per die.

WATER TO THE RESCUE: Properly-positioned nozzles shoot intense jets of water onto slabs in descaling operation at reversing mill.

Rotary furnaces heated these billets. Then they were moved to the presses. At this stage it was easy to position descaling nozzles to spray the billets on their way to the press.

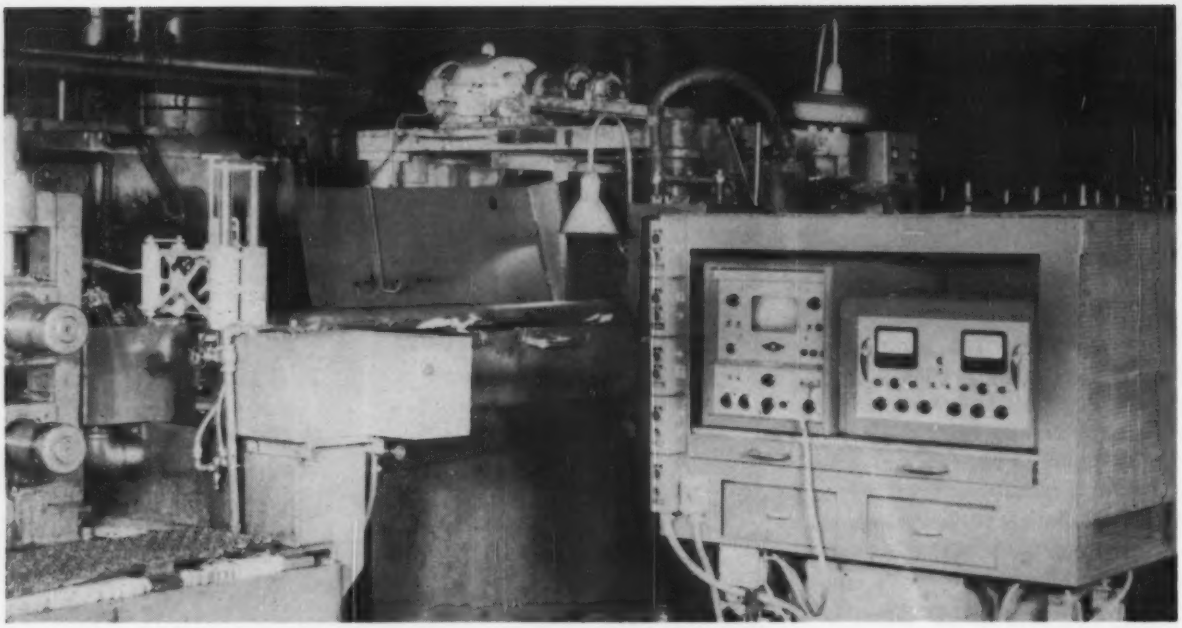
The ideal nozzle pressure for descaling carbon-steel billets is about 1400 psi. Alloy steels demand between 1800 and 2000 psi, and sometimes as much as 2500 psi.

Choose Your Pump — Direct pumping to nozzles is an economical method for this type of descaler. The use of limit switches unloads pumps between sprays. But keep away from start-stop pump methods. They can cause your motor to overheat.

Keep all conveyor roll bearings well oiled. And keep them free from bits of scale too. Hang chains from the entrance and exit to the spray cabinet to break up the escape of any water streams.

Moving the Billets—Power conveyors are the most reliable means of moving billets through the descaling jets. For best results, make sure the conveyors have moving chains with lugs. They actually push the billets along on the water-cooled rails. Here you can count on speeds of 50 to 150 fpm.

If your designs call for nozzle manifolds, give some thought to end descaling. You can get it from nozzle placement and angle, provided that your ends are smooth. You'll never be able to descale if the ends are notched and cold-broken.



SEARCH OUT FLAWS: Ultrasonic equipment checks every inch of tubing for flaws. Immersion testing takes place soon after welding sequence. The unit's warning system alerts inspectors of any defects.

Ultrasonics Improves Quality Of Heat-Exchanger Tubing

Profit-minded manufacturers know that their products must be near-perfect if they expect to stay on the top of the heap.

What more could a customer demand—finished products that not only meet strict ASTM codes, but exceed some of them.

▪ The carbon-steel tubing used in heat exchangers must be just right. For some time now, the favorite of the petrochemical industry has been seamless tubing. But some rough competition is moving into the field.

From where? It's welded steel tubing. But a new method of production transforms this product into something entirely new. A thorough quality control system governs every single manufacturing step from the time the strip steel arrives at the rear bay until final shipment.

As far as its use in heat exchangers is concerned, this new tubing is equal to or even better than the seamless variety. At least, that's what they're saying at the Tubular Products Div., The Babcock & Wilcox Co., Beaver Falls, Pa.

And they should know. They've made both types. The end result? They're replacing their seamless line with the new Lectrosonic tubing.

Finds Every Flaw—Quality control at Beaver Falls gets its biggest boost from ultrasonic testing. B & W now uses this technique to test every single inch of tubing soon after welding. And it's done during production.

First, they set limits for defects. Any defect beyond that limit automatically lights up a warning lamp on the oscilloscope. Just to make doubly sure, a horn sounds at the mill inspectors' stations. And to make the job complete, a spray gun marks the spot of the defect.

Marked areas are then studied for degree of defect. This lot of tubes is then tagged for special checks, including magnetic-particle, visual and deformation tests.

Insures Sound Welds — Special attention focuses on preparing the strip for welding. Under the new setup, B & W no longer receives mill-trimmed strip. The new strip now comes in from the mill with enough edging to allow for slitter trimming at the tubing plant.

It's trimmed right before welding. This change prevents rust formation

on the edges, an old hazard for resistance welding.

Another station on the line removes the weld flash or bead from both the inside and outside. This step is also automatic. In effect, this surpasses some of the ASTM requirements on some sizes for flash removal. Nevertheless, inside flash removal aids corrosion resistance and flow properties.

Uniformity—Better grain structure throughout the tubing is provided for too. By subjecting the welded strip to a continuous normalizing heat treatment, the grain structure between the weld and the body of the tube ends to "homogenize." The result, of course, is uniform ductility. And that's very desirable.

To keep the welds from varying, single-purpose motor generator sets are used as power sources. As such, there's no power drop, the culprit of more than one uneven weld.

Starts at the Dock—Quality control begins the moment strip is unloaded from incoming carriers. An inspector cuts representative samples and checks them for hardness, thickness, and width. The lab then performs a chemical analysis on each sample to make sure the steel is up to snuff.

The acceptable coils are then fed into a leveler for flattening. After square cuts are made on each strip end, the separate strips are joined together by welding to form a continuous coil.

This welded section is not used in the final product. Punched holes in the strip indicate where these welds are made.

Makes Even Edges—A rotary slitter then prepares the edges to an exact and constant width. Forming comes next. A series of rolls shapes the strip into cylindrical forms. Pressure from the welding electrodes forces the two strips edges together.

A modern roll shop keeps constant watch on the rolls that form the tubing from flat strip. It's the job of the shop to maintain the proper shape of each roll. Checks are usually made after every long run.

As the formed tube enters the welding mill, electrodes ride on both sides of the seam. Pressure rolls, just below the electrodes, force the edges into contact.

Smoother Surfaces — The next step involves flash removal. Special cutting tools smoth out weld beads in a continuous operation. This setup treats both sides of the tubing.

It's then ultrasonics turn to get into the act. The ultrasonic testing unit is backed up by a battery of other testing equipment. The former device spots any flaw above the preset minimum.

The other equipment carries the checks a step further: to examine previously-detected flaws for possible reject.

Further Refining—In the sizing mill, tubing is not only sized but straightened as well. After cutting the tubing to standard mill lengths, the sections containing butt-welded joints, marked by punched holes, are discarded.

All Lectrosonic tubes receive a normalizing treatment in a controlled-atmosphere furnace. An oxide finish is also applied to retard rust. This same setup prevents scale from forming, since the tubing is cooled before it even leaves the furnace.

Exact Lengths—Rotary straighteners push the tubes further along the line. Then cut-off machines trim the tubes to exact, required lengths. Also, mechanical tests are made on tube-end coupons. These are all flattening tests.

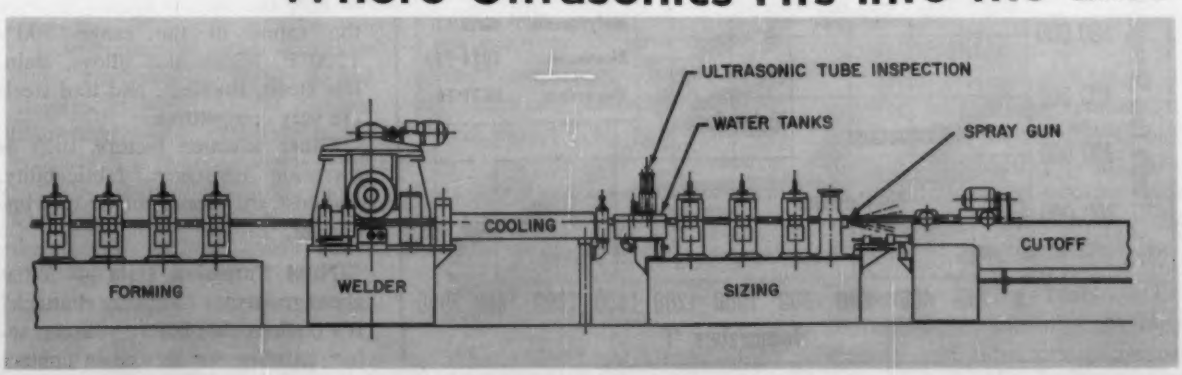
Each heat-exchanger tube undergoes hydrostatic testing too. Pressures range from 1000 to 6000 psi. During this test, a worker strikes each tube with a mallet. This added shock should disclose any possible weak spots.

The Last Check—A final inspection examines surfaces. It also includes dimension and length checks. By this time, the customer should feel confident that he now has a piece of quality tubing.

B & W's heat-exchanger tubes meet ASTM specs A-214 and A-334, Grade C. They also meet corresponding ASME specs.

Made in an array of sizes up through 4½ in. OD, Lectrosonic tubing includes the usual standard wall thicknesses.

Where Ultrasonics Fits into the Line



Demand For Missile Materials Spurs Metals Research

Missiles function under conditions much more severe than those experienced by other air vehicles.

How is metals research meeting the challenge?

▪ The metal needs of the missiles industry are a tiny fraction of the country's total annual metal consumption. Yet, this fraction is responsible for more metals research than perhaps any other group.

This observation was made at the recent convention of the American Institute of Chemical Engineers held in St. Paul. The speaker was W. Stuart Lyman of the Battelle Memorial Institute, Columbus, O.

Mr. Lyman pointed out that the primary reason for this situation is that national security depends upon missile development; and missile developments demand improved alloys and new metal fabrication techniques.

Meet Severe Conditions—Missile structures are unique in that they must perform their load-carrying functions under conditions much more severe than those experienced by other air vehicles.

Temperature, for example, can range in a single missile from about —400°F to a calculated skin temperature of 9000°F. There are no materials to withstand 9000°F, so the heat will have to be dissipated by ablation, conduction, or some kind of cooling medium.

Moreover, the wide temperature range results in a number of problems that arise from variation of metal properties with temperature. Strength goes down and ductility rises as temperature increases.

Other unique aspects of missile flight are the loads imposed upon the structure and the service life.

Missile Loads Vary—Missiles fly at speeds and accelerations such that loads fluctuate and change rapidly. A control fin, for example, might undergo two tensile and compressive maximums in less than 2 seconds.

Thus, engineers must concern themselves with a new field of materials testing—the measurement of properties under rapid heating and loading conditions.

"Chemistry becomes important again to the metallurgist when he works in missilery," states Mr. Lyman. At high temperatures, oxidation is the main materials problem. Chemical attack by propellants can occur. And exhaust gases erode and corrode metal parts in their blast.

Other Problems Arise—This is only part of the problem that confronts the materials engineer. He must take into account any number of materials (each with its own special properties), design criteria, producibility and cost. And often, local lack of data and prejudice must be overcome.

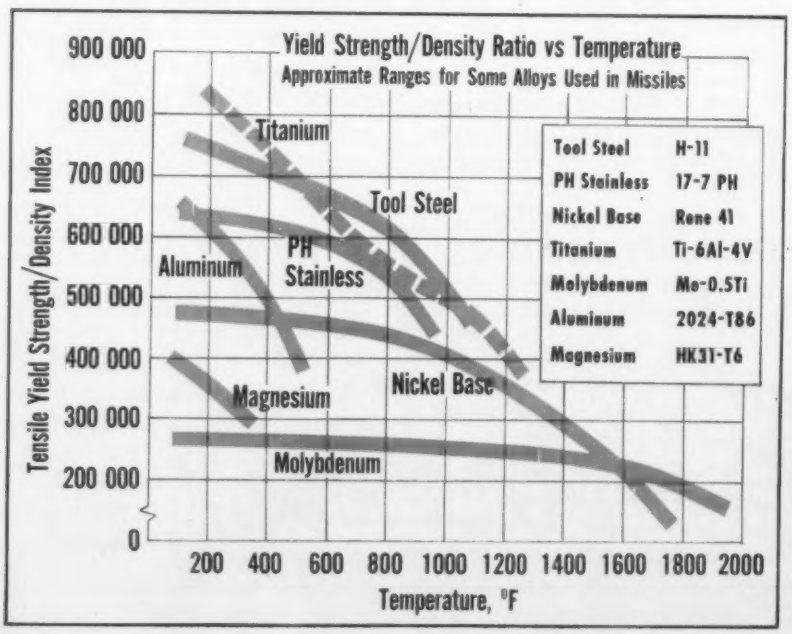
Ideally, missiles should be light. Thus, the ratio of strength/density at temperature is the main index for missile alloy selection.

A chart plots the strength/density ratio vs. temperature. It's interesting to note the narrow spread between the ratios in the range 500°-1200°F. Nickel-base alloys, stainless steels, titanium, and tool steels are very competitive.

Other selection factors, such as corrosion resistance, fabricability, and cost, therefore become very important.

Need Corrosion Data — What about resistance to chemical attack? It's obvious that before you can select an alloy for service in contact

Metal Density Affects Choice



with missile propellants, you need have specific test data.

The attached table summarizes some general considerations before alloy selection. Many combinations and sets of conditions have not yet been evaluated and care should be taken.

A factor in alloy selection for missile application is the relative ease with which different alloys can be made into finished parts. Sometimes, this is the deciding factor.

There is no one best fabrication method. There are any number of paths to produce a finished part. Missile structures require, for example, large domes, cones and bulkheads. Fabrication of these units challenges the producibility engineers. The present alternatives seem to be: spinning, deep drawing, forging, and explosive forming.

Figure Finished Cost—Cost should include not just raw material cost but cost of finished parts, installed in the missile.

The aim is not to build the cheapest possible missile. Instead, the structure should be designed to lightest weight, at a supportable cost. The problems are: to find the value of saving a pound of weight, and to know how materials, fabrication and installation costs vary from alloy to alloy.

Finding the solution to these two problems, says Mr. Lyman, is the essence of missile-materials engineering. Once this is done, the rest is arithmetic.

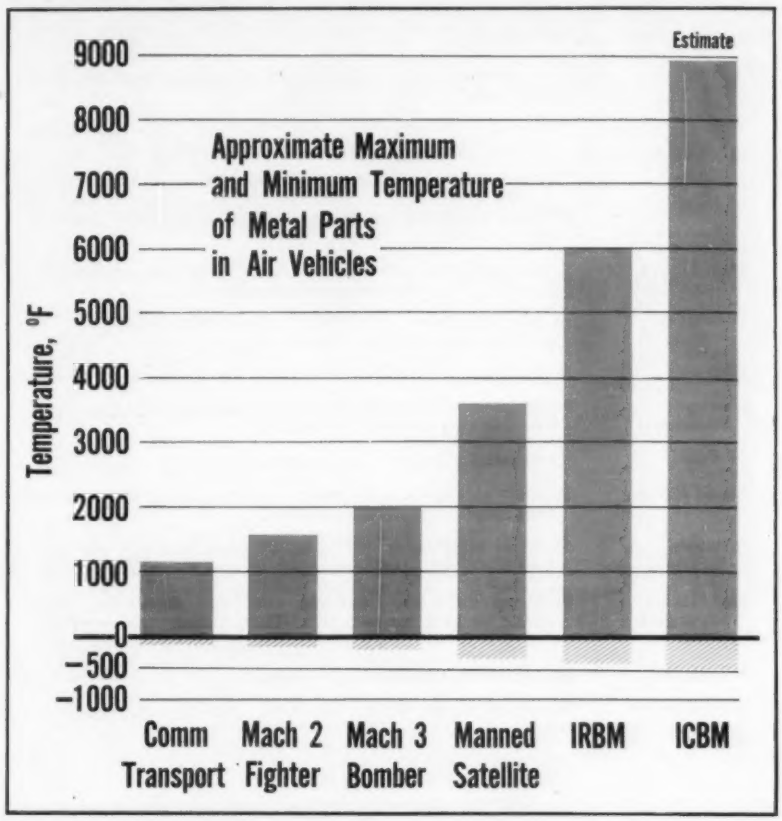
Includes Alloy Studies—Current metallurgical research includes studies into refractory alloys, high-strength and light alloy development, and fabrication research.

Development of alloys of columbium, molybdenum, tantalum, and tungsten to withstand the extreme temperatures of re-entry and rocket exhausts is a major research effort.

"Why are these metals the chosen few? They are the most available metals with melting points above 3500°F. And high-temperature strength of alloys is generally proportional to the melting point."

But these refractory metals are not oxidation resistant. Alloying may help; a more likely solution lies in protective coatings. Much work is under way. Problems are great but they can be solved.

Temperature Range Is Problem



Can Steel Compete?—The main alloy systems involved in high-strength research are: cold-worked austenitic steels, precipitation-hardening stainless steels, titanium, and tool steels.

Mr. Lyman continues: Steel is handicapped because it's about 40 pct more dense than titanium alloys. Even when metals have the same strength/density ratio, less dense alloys have an advantage in lightweight design. This is because design is imperfect. Some material is only lightly stressed and, in essence, just goes along for the ride.

Steel, however, has one decided advantage. It is much cheaper than titanium at the present.

What About Light Alloys?—Currently, the chief interest in the light alloys is beryllium. This metal offers the potential of a modulus of elasticity some 50 pct higher than steel in a metal with only ¼ of steel's density.

Alloys with lithium are getting a play these days. Magnesium-lithium alloys are about ⅓ less dense than beryllium. A lithium-containing aluminum alloy just reached the market.

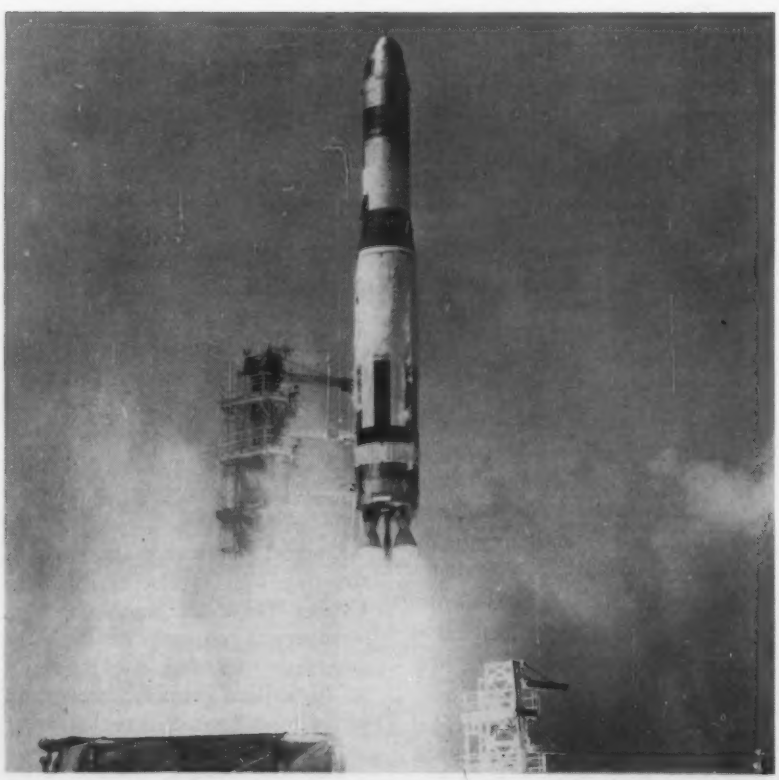
It is about 3 pct lighter than standard aluminum alloys. It is 8 pct stiffer and maintains its strength to roughly 400°F.

Current fabrication research is stressing four topics, reveals Mr. Lyman. These are: machining high strength and refractory metals; high-energy-rate forming; working steels at subcritical temperatures; and wrapping of composite rocket cases.

Improve Cutting Tools — Improvements in machining the high-strength and refractory alloys are

Fuels Need Compatible Metals

PROPELLANT	REMARKS
Alcohol	No noteworthy problems; may be mildly corrosive if contaminated with water.
Chlorine Tri-Fluoride	Preferred material: Monel; below 300° F: steels and Al, Cu, and Ti-base alloys probably equally compatible.
Fluorine	Liquid fluorine: steels, Al, Ni, and Ti-base alloys probably equally compatible, if water absent; from 300° – 1000° F: Monel preferred. High flow rates and pressures increase corrosion rates.
High Energy Boron Fuels	Exhaust gases—loaded with boric oxide, carbon and free boron—attack high temperature alloys severely.
Hydrazine	Heavy metal atoms—Cu, Mo, and above—must be absent from alloys to avoid hydrazine breakdown.
Hydrogen	May be absorbed by steels or titanium with embrittling effects.
Hydrogen Peroxide	Preferred materials: aluminum and passivated stainless steel. Titanium catalyzes H_2O_2 breakdown.
JP Fuels	No noteworthy compatibility problems.
Liquid Oxygen	Titanium may ignite in lox under impact; stainless steel and Al-base alloys are much less sensitive.
Nitrogen Tetroxide	Materials resistant to boiling 65% HNO_3 probably are compatible with NO_4: stainless steels, Al-base and Ti-base alloys.
Red Fuming Nitric Acid	Preferred materials: stainless steel and aluminum. Acid should be inhibited with HF. Ti-base alloys and anhydrous (<2% H_2O) RFNA are a potentially pyrophoric combination.
RP Fuels	No noteworthy compatibility problems.
Unsymmetrical Dimethyl Hydrazine	Must avoid Cu and Mo bearing alloys. (Similar to hydrazine.)



TITAN BLASTS OFF: Material selection for missiles such as the Titan involves environment, design criteria, producibility, properties and cost.

being sought by development of improved cutting materials and tools. New metal removal procedures using electric sparks are also being studied.

High-energy-rate explosive forming has special promise for missile parts. There is evidence that high energy rates can form high-strength alloys where standard low-speed forming techniques cannot.

Subcritical deformation of steels is a newly worked out method of combining heat treatment and forming. Mr. Lyman points out that it produces specimens with tensile strengths up to 400,000 psi. "Deformation is carried out at about 1000°F immediately after cooling from a higher temperature where austenite was the stable phase, but before the austenite, unstable at 1000°F, has had time to transform."

Adapt This Sequence—This treatment is potentially adaptable to missile structures which can be spun or otherwise severally formed to final shape and dimensions.

Spiral wrapping is a method whereby composites are constructed from strong thin metal strip and some non-metallic bonding materials. Perhaps, the highest-strength rocket motor cases are being made using this technique.

Not to be overlooked is the need for a source that can supply data to engineers and scientists. Mr. Lyman says that the Defense Department is easing this problem in regard to missile materials.

There's a Defense Metals Information Center at Battelle Institute. The Center collects all current available documents on defense metals; it analyzes and summarizes the data and issues reports to nearly 2000 engineers, scientists, and managers working on or supplying materials to government-sponsored project.

Reprints of this article are available as long as the supply lasts. Write Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

WHITE ROOM: In a shop kept free from toxic dust, machinists develop new techniques for working beryllium.

New Lab Makes Space-Age Bolts

Pilot Plant Works Beryllium Into Missile Fasteners

Worth its weight in gold in more ways than one, beryllium is one of the best prospects yet for missile fasteners.

Here's a lab devoted to developing it for this use.

▪ If a new metalworking pilot plant in Jenkintown, Pa., looks like something from outer space, it's perhaps not inappropriate. For that's where its products are eventually headed.

This specially equipped shop is the Exotic Metals Laboratory of Standard Pressed Steel Co. It's devoted to developing techniques for machining beryllium and making it practical for missile and satellite fasteners.

Beryllium is literally worth its weight in gold—in fact, it's currently more costly. But its value is likely to be far-reaching in the lightweight fastener field.

Lightweight Contender—This is because it has only one-fourth the weight of steel and superalloys. Thus a beryllium bolt that can support a 125,000-psi load is, on a strength-to-weight basis, the equivalent of a steel bolt with 500,000-psi tensile strength.

But the strongest steel bolts on the scene today rate at only 260,000 psi. So 1 lb of beryllium bolt can do the job of 2 lb of the strongest steel bolts.

Problems — But, like anything else relatively new, this metal still has certain bugs to be ironed out. For one thing, it is exceptionally notch-sensitive.

This means that the threaded parts of nuts and bolts do not necessarily have the same strength as the parent material. Though bar stock rated at 125,000-psi tensile strength is being produced, this does not mean that this full strength can yet be utilized in a threaded fastener for every application.

That's the why and wherefore of SPS's shop. Machinists there are actually technicians. They aren't just turning out threaded fasteners, although that's part of their job.

New Methods—They are developing machining methods for future use. For the design engineers in the unit are exploring new fastener designs to capture more of beryllium's inherent lightweight strength.

Housekeeping is the object of careful attention, because beryllium dust is toxic. That's why the whole shop, and all work garments, are white—to help insure that everything stays clean.

All machines are equipped with tubes to carry away dust, and machines like grinders, which kick up a lot of it, are completely enclosed.

A Bargain—Those in the know, however, appreciate that beryllium is worth all this trouble, and worth every penny of its current high price. With the cost of putting one pound of satellite in orbit $1,000,000, a pound of beryllium that does the job of two pounds of steel is a pretty fair buy.

Uses are also foreseen for beryllium in the nuclear field. Since it reflects neutrons and is corrosion-resistant, it should find application in atomic equipment of all kinds.

How Method Lifts Ingot Quality

Controls During Steelmaking Process Bring Uniform Analysis

It's the reject rate in end-product fabrication that points up ingot quality.

Here's a method that proves itself by cutting the rate many times over.

▪ Careful control of variables in the steelmaking process has brought one specialty steel company a step closer to achieving the "ideal ingot"—one that has uniform analysis throughout.

It's a practical system of quality control that produces consistently superior ingots. Its developer, The Carpenter Steel Co., Reading, Pa., calls the system Mel-Trol (for melting-control).

The primary purpose is to eliminate the occasional batches of steel with inferior properties. It's these heats which ultimately contribute to part failure and a higher reject rate for the steel fabricator.

A Case in Point—The average reject rate on a critical component was about seven parts per 1000. The part, subjected to hydraulic pressure at the core, was made of SAE 6145.

When the part was made from the same grade of steel manufactured under the Mel-Trol method, the reject rate dropped to only two parts in 90,000. There are other cases, Carpenter reports, where Mel-Trol has resulted in major improvements in the consistent behavior of bars and billets.

The system controls four major variables in the steelmaking process: scrap charge, melt composition, bath temperatures, and solidification of the metal in the ingot mold. The company has succeeded in controlling the latter through use of a unique, patented ingot mold.

SPEED ANALYSIS: New spectroscope determines quantity of major elements in 3 minutes and important minor elements in less than 12 minutes.

First Control Scrap — The first step in the system is analysis of the scrap charge. Composition of the scrap affects ingot core quality.

If composition limits are too broad, harmful residuals will collect in the melt and ultimately be trapped in the solidified ingot. Adequate inspection of incoming scrap requires 75 to 80 samples per lot for proper control.

Residual elements present a growing problem. Since World War II, for example, the average copper and molybdenum content of stainless scrap has doubled. Neither element is oxidized during the melting process. And since both elements decrease the forgeability of stainless steels, the scrap charge of heats for forge stock must be sorted and classified to insure predictable performance.

Improves Quality — Carpenter finds it necessary to classify scrap into six different categories for making just one particular grade of stainless steel, Type 403. It pays off in improved billet forging quality and closer control of mechanical properties.

For high-speed tool steel heats, Mel-Trol sets extremely narrow scrap limits. To insure uniformity, at least six sample analyses per ton of scrap charged are required. Residual elements in high-speed steels can cause erratic response to heat treatment.

A sizable portion of scrap used for making tool and die steels consists of borings and turnings from machining operations. Frequently this scrap is coated with cutting compound. Before charging into the furnace, this oil is burned off.

But other compounds, especially those which contain lead and tin, can cause "hot shortness" in stain-

less and high temperature alloys. Scrap contaminated by such impurities is avoided.

Fast Analysis—In the Mel-Trol system, variations in composition are reduced to a minimum by frequent spectroscopic analyses of the heat. The quantity of all major elements can be determined within 3 minutes. The amount of any important minor element can be determined in less than 12 minutes.

Constant analyses of the metal during the melting process is vital because in this state, composition of the heat is continually changing.

Elements such as carbon, chromium and manganese oxidize readily and react with slag and oxygen. The amount of each element remaining is a function of both time and temperature.

Control Temperature—The Mel-Trol system relies on the immersion Rayotube for bath temperature control. This instrument, made by Leeds & Northrup Co., Philadelphia, enables the melters to obtain an accurate temperature reading in 5 seconds.

Equipped with a graphite insert for protection, the Rayotube can be used for consecutive readings without any unusual labor or maintenance. To operate it requires no skilled personnel. Because of its simplicity of operation and speed of measurement, reliable temperature control of heats can be obtained to within 20°F from meltdown to tap.

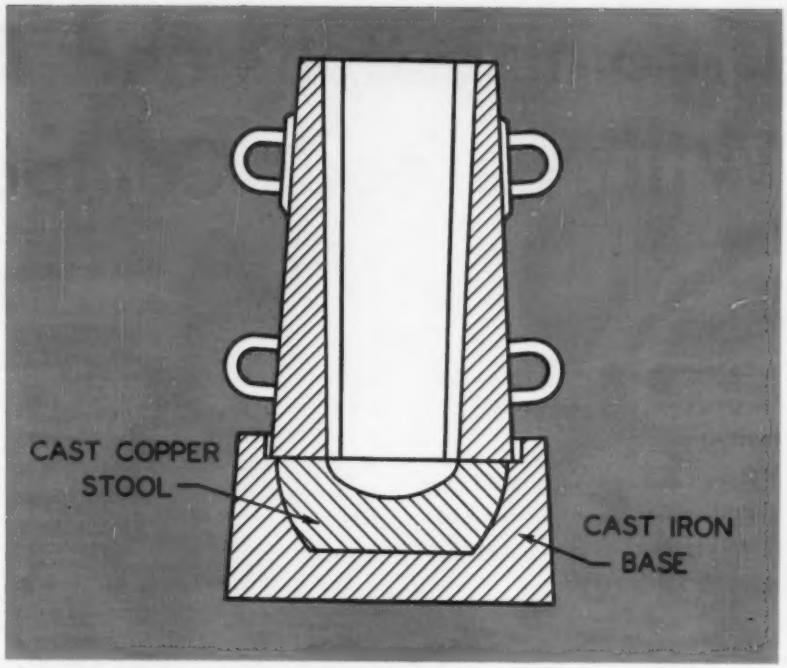
It's an improvement over optical pyrometers previously used to check bath temperature. While these instruments were useful for measuring tapping temperatures, they were not accurate enough or fast enough for routine control of temperature during the refining period.

Bottom-to-Top Freezing — The new mold design used in the Mel-Trol method is the result of many years' study of the segregation pattern of steel undergoing solidification. It minimizes many of the problems imposed by segregation.

The new mold is designed to extract heat rapidly at the bottom of the ingot. It promotes solidification from the bottom up, trapping impurities at the top of the ingot. The top is cut off and discarded.

To accomplish bottom-to-top freezing, short, stubby molds are placed on a heavy copper stool inserted in a cast iron mold. There's an essential ratio between the height of the mold cavity and the width at the top of the cavity.

The new mold design proves to be a key factor in Carpenter's bid to produce quality steel with consistent mechanical properties. The mold is also being used in vacuum induction melting, as an added improvement to this process.



DESIGN IS KEY FACTOR: Patented mold design promotes solidification from the bottom up, tapping impurities at the top of the ingot.

CONTROL DURING REFINING: Immersion pyrometer takes only 5 seconds to indicate a temperature reading during critical refining period.

Chromize Bolts and Tubing With Gaseous Compound

By Dr. G. Becker—Deutsche Edelstahlwerke A. G., Krefeld, West Germany

Chromizing parts embedded in powder can be slow and costly.

Here's an easy method for providing corrosion-resistance that uses a gaseous chrome-halogen compound.

▪ Since corrosion starts at the surface, metallurgists try to give workpieces of non-alloyed steel the surface properties of corrosion-resistant steel. This is done by diffusing chromium into the surface zone.

Initial trials involved embedding and heating the steel articles in chrome or ferrochrome powder. This was uneconomical. The transfer of chromium into the workpiece requires intimate contact with the embedding powder; it can be obtained only after long periods at very high temperatures.

What Is The Answer?—Studies show that the method can be simplified and improved. The key is to subject the steel surface not to chrome metal but to vaporizable compounds. Chrome-halogen compounds suit these purposes very well.

The compound acts as chrome carrier. It causes the chromium to contact uniformly all surface points of the workpiece while the chrome is in the atomic—finest distributed and most active—condition.

A molten salt bath also gives intimate and effective contact. But such baths can be economically used in small sizes only, and entail other processing problems. Thus, the salt bath method has not found much industrial usage. In contrast, chromizing steels by vaporous transfer is now being used extensively, in various ways, for large-scale production.

The workpieces being processed must not touch each other because any point of contact prevents the formation of a good, protective coating. It may also cause the surfaces to fuse together during chromizing.

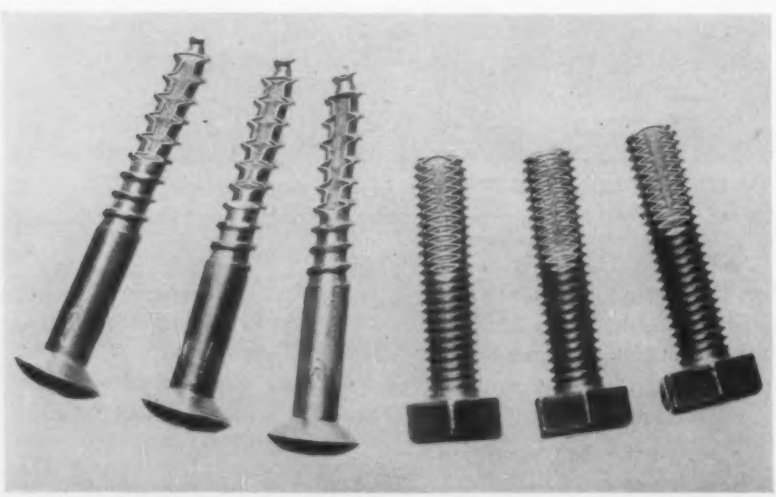
Need Spacer Layers—This makes it necessary to provide spacer layers. Such layers consist of pieces of chromium, ferrochrome, ceramic material, or mixtures in which ceramic particles serve as chrome-halogen storer and carrier. The particular choice of spacer material depends upon the type of processing used.

Normally, the chrome-halogenide is supplied to the workpiece as a gas. But the use of spacer material permits synthesizing the chrome-halogen compound during processing of the workpieces—from the chromium contained in the spacer material.

Which chrome-halogenide is most suitable? This depends partly upon the type of the workpieces being processed. In each case, the halogen vapor, contacts the heated objects, reacts chemically with them, and gives off chromium atoms which diffuse into the workpiece.

Depends On Temperature—The penetrating depth depends, within certain limits, upon the processing time. But it is more strongly dependent upon the magnitude of the processing temperature.

In principle, chromium can be diffused into any steel. Even stainless steel can be chromium-enriched by diffusion. However, as the carbon content of the basic material increases, chrome penetration



RUST-FREE BOLTS: Grinding and etching corrosion-resistant IK-steel bolts reveal the depth of the chromium protection.

is impeded. This is due to the formation of chrome carbides which interfere with the further diffusion of the chromium.

A coherent and closed carbide layer forms when there is a relatively high carbon content in the basic material. This carbide layer is thin but is very hard and wear-resistant.

Get Brittle Layers—Under certain conditions, however, the carbide layers are brittle and not absolutely free of pores. This is observed particularly with materials of relatively high carbon contents, such as gray cast steel. Thus, satisfactory corrosion-protection is not obtained in these cases.

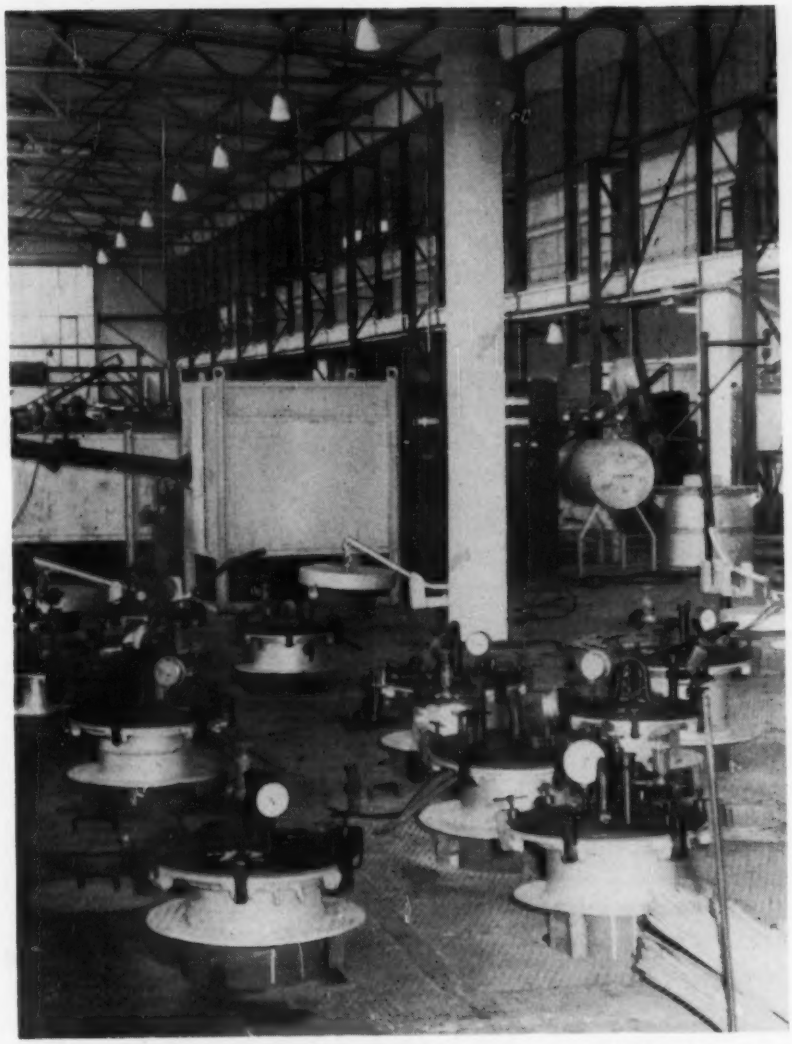
Experience tells us that even thick chromized zones do not necessarily give wear resistance under humid conditions. Certain prerequisites with respect to the composition or constitution of the basic material must be met.

During the diffusion process, carbon migrates from the interior of the workpiece towards the entering chromium; the size of the workpiece cross-section affects this travel.

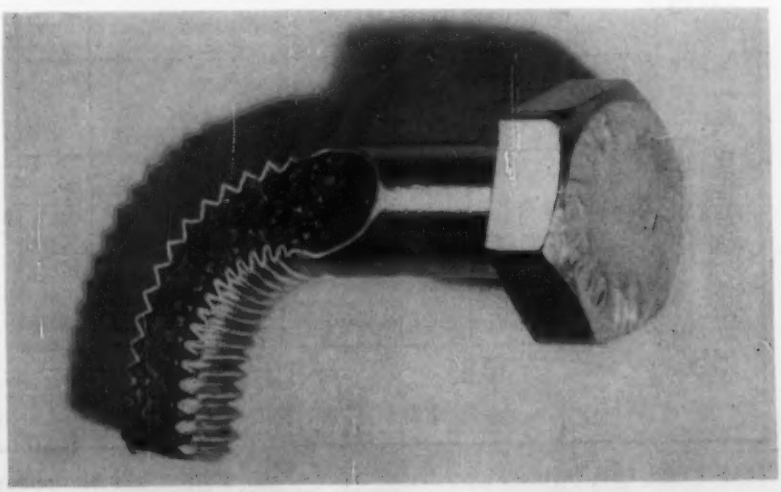
Impairs Properties—The resulting texture may impair the physical properties of the chromized zone; under the effect of moisture, it may also result in a kind of intercrystalline corrosion.

This is fairly common when parts meet prolonged stresses under humid conditions. Obviously, in these cases where the chromized surfaces are not effective enough to protect from long-term corrosion, it is easier and cheaper to use other methods of surface treatment.

To cope with these phenomena, special steel compositions have been developed by Deutsche Edelstahlwerke A. G., Krefeld, West Germany. They are well suited for chromizing and afford an optimum of desired or required properties. (Conventional carbon-infusion by case hardening requires using suit-



CHROMIZES LONG LENGTHS: Length of pipe still glows hot after chromizing treatment in electrically heated containers at the Schoeller plant.

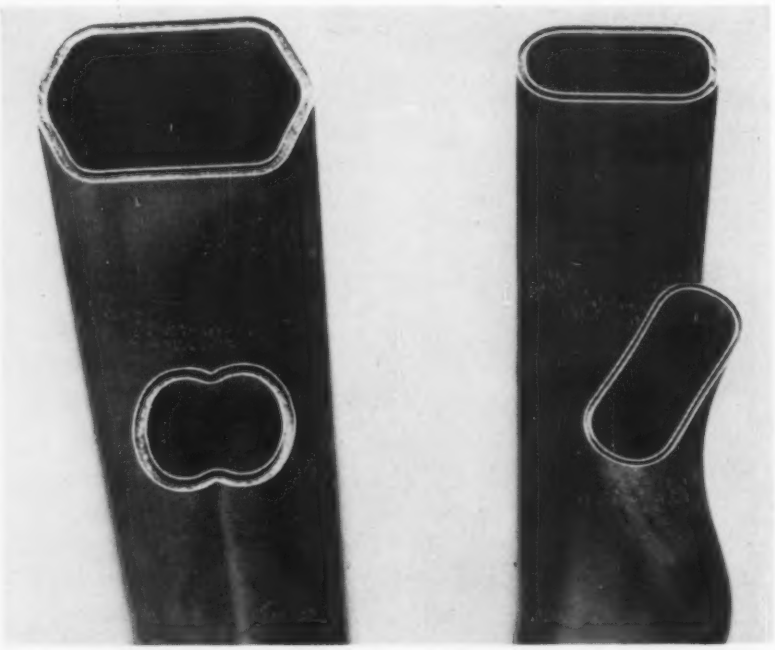


WITHSTANDS BENDING: Test calls for bending of steel bolt in thread area. Deformation causes no damage despite the sharply notched thread.

able types of steel; the same applies to chromizing.)

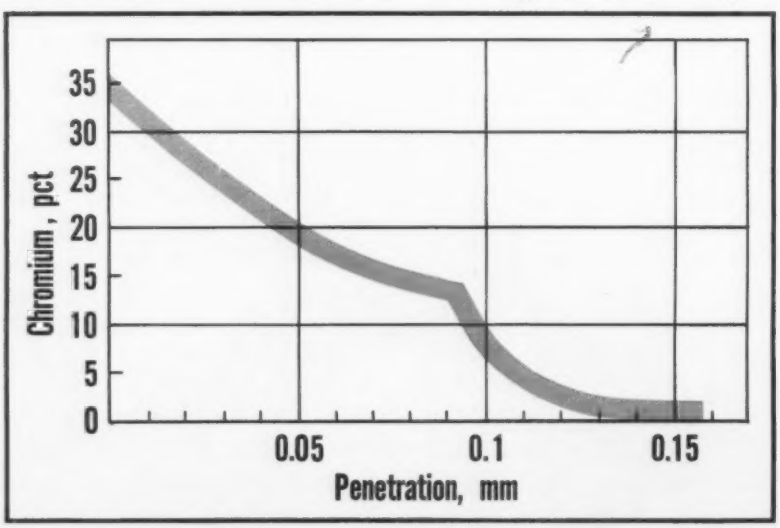
When these special steels (IK-steels) are chromized, they afford permanent corrosion protection even under prolonged stresses and humid conditions. They also meet strength and ductility requirements.

Chromium Atoms Decrease— The number of chromium atoms in the diffusion zone decreases from the surface towards the interior. Due to this gradual transition, the protective surface zone is ideally grown together with the core material.



COATS TUBING SURFACES: Chromizing is a boon to protective tubing for electric heater elements. Note chromium layer on both surfaces.

Chrome Content Drops Slowly



HAS LESS CHROME: More than 30 pct at the surface, the chromium content gradually decreases towards the interior of the workpiece. Penetrating depth is time and temperature dependent.

No scaling occurs even if the chromized workpiece is subjected to deformation. Thus, the chromized products can be worked, with certain limits, by rolling, drawing, pressing, or other chipless fabrication. IK-steel spindles, for example, are finished by rolling to strengthen and smooth the surface; this provides good journalling qualities.

Certain screw bolts, used for structural components, must include these properties: they must not weaken from corrosion; they should not freeze due to rusting; they must be readily loosened if necessary. In this field, therefore, chromized steel bolts made of IK-steel are very popular.

Seals From Carbonizing — The high surface chromium content also protects against carbonizing at high temperatures. You can subject chromized parts to temperatures up to 850°C. At higher temperatures for long times, the chromium content of the surface decreases due to continuing diffusion; thus resistance to burning decreases.

Short-time exposures to high temperatures are not detrimental even if they occur frequently. This protection is valuable—particularly for various types of tubing.

Examples are pipes for air preheaters or other heat exchangers, and protective tubing for electric heater elements. In both cases, the tubing is heated up to red heat.

Meets Deformation—The tubing must also have good deforming properties since the manufacturers first assemble and embed the electric wires in straight tubes prior to bending or other deformation.

The chromized zones will not split off under thermal stresses; thus, chromized products can be subsequently heat-treated for improving physical properties.

In the United States, IK-steels are available through Marathon Specialty Steels, Inc., New York City, a division of Deutsche Edelstahlwerke A. G.

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PATENT REVIEW

New Patents In Metalworking

Bright-Finishing Strip

Method of making bright-finished steel strip, J. M. Kiefer, Jr. (assigned to U. S. Steel Corp., a corp. of N. J.), Sept. 29, 1959. To produce bright-finished steel strip, cleaned hot-rolled strip is cold-rolled to approximate finish gage, then annealed in four distinct steps, and finally temper-rolled between polished rolls to final gage. No. 2,906,652.

Cold-Rolling Mills

Cold rolling mills, Y. Murakami, Oct. 6, 1959. In 4-high-type mills, the backing rollers are placed in contact with a pair of backup rolls at several points, with fixed pressure on the backing rollers, while the backup and possibly the work rolls are prestressed. This enables obtaining uniform thickness by controlling pressure strain in the rolls. No. 2,907,235.

Open-Hearth Fluxing

Method of treating openhearth steel, R. J. Anderson (assigned to The Dow Chemical Co., Midland, Mich.), Oct. 6, 1959. In an improved method for fluxing molten basic openhearth steel slag, anhydrous $CaCl_2$ is added to the floaters, with or without supplementary addition of fluorspar. No. 2,907,652.

High-Temperature Alloy

High-temperature alloy, J. A. Nelson (assigned to Continental Copper & Steel Industries, Inc., New York, N. Y.), Oct. 13, 1959. A free-machining precipitation-hardening alloy for high-temperature applications consists of the following percentages: 2.5 to 6 Co, 0.065 to 3 Cu, less than 0.15 C, up to 6 Cr, less than 1 each of V, Mn, and Si, less than 3.5 Mo, W in specified ratio to the Mo, balance Fe. No. 2,908,565.

Desulphurizing

Method for desulphurizing molten metal and in particular liquid pig iron, M. Allard and L. Wahn (assigned to Institut de Recherches de la Siderurgie, Saint-Germain-en-Laye, France), Sept. 29, 1959. Molten pig iron is desulphurized by introducing into the bath a suitable agent, such as lime, magnesium, calcined dolomite, oxides of alkaline earth metals, calcium carbide, and calcium cyanamide. Nos. 2,906,616-7.

"Patent Review" appears in the third issue of The IRON AGE each month. Look for it in the December 17 issue.

Charging Flue Dust

Blast Furnace, H. W. Hochberger (assigned to U. S. Steel Corp., a corp. of N. J.), Sept. 29, 1959. Apparatus for automatically charging unsintered blast furnace flue dust into the furnace in such manner that a large portion will remain in the furnace. No. 2,906,520.

Durable Coating

Corrosion- and abrasion-resistant coated metals, H. R. Smith, Jr.

(assigned to Temescal Metallurgical Corp., Richmond, Calif.), Oct. 6, 1959. Method of coating ductile sheet steel with a very thin continuous crystalline layer of a suboxide of aluminum or silicon. The coating is so firmly adherent that it retains its continuity even when the sheet is sharply bent. No. 2,907,679.

Chill-Mold Diecasting

Diecasting of iron in chill-molds, L. Peras (assigned to Regie Nationale des Usines, Billancourt, France), Sept. 29, 1959. To produce castings of pearlitic structure containing diffused fine graphite particles, a suitable iron is diecast in a chill mold, and the casting stripped from the mold while still hot, heat-treated in a single cycle, and cooled in air. No. 2,906,653.

Making Metal Powders

Metal powders comminuting nozzle for producing metallic powders and oxides, W. G. Hegmann, Jan. 13, 1959. A tubular stream of molten metal or liquid is subjected to the action of two counter fluid blast streams. The discharge points lie in a single transverse plane, thus effecting instantaneous contact of all three streams. The nozzle parts contacting the molten metal are an electro-cast refractory which permits atomizing the higher-melting-point metals. No. 2,868,587.

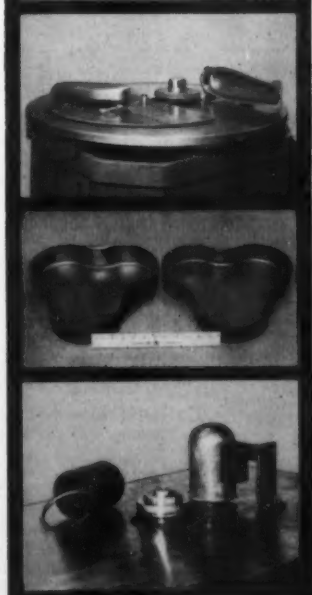
Hot Dip Coating

Finishing machine and method for use in the hot dip metallic coating of steel strip, and coated strip, T. W. Baker (assigned to Armco Steel Corp., Middletown, O.), Sept. 29, 1959. Machine and method for high-speed production of very thin metallic coatings on thin-gage steel strip, particularly tinplate having an iron-tin alloy surface with no virgin tin remaining on the strip. No. 2,906,018.

Copies of U. S. Patents are available at 25¢ each from Commissioner of Patents, Washington 25, D. C.

LOOK WHAT YOU CAN DO WITH A BEATTY-QUICKWORK STAMPING TRIMMER

STAMPINGS before and after trimming



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Artist's conception of Titan Launching Complex; Courtesy American Machine & Foundry Company.

Surfaces of structural steel and aluminum on the Air Force's Titan Missile Launcher System are protected against corrosion with Zincilate. Zincilate is supplied to American Machine & Foundry Company, associate contractor under the Ballistic Missiles Division of the USAF.

Zincilate, as modern as the missile equipment it protects, provides true galvanic protection to iron, steel and aluminum. Easily applied, before, during or after fabrication, without requiring special equipment or even mixing. Now in its 13th consecutive year of sea coast exposure tests, Zincilate has yet to show any signs of rust. Write for complete information; samples available.

PROTECTION that SELLS your PRODUCTS
INDUSTRIAL METAL PROTECTIVES
402 Homestead Ave. • Dayton 8, Ohio • BAldwin 2-6747, 2-6748

FREE LITERATURE

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 139.

Temperature Controls

An eight-page folder describes the in-plant use of temperature controls in a variety of applications. Included is a brief description of a line of controls for these purposes. (Fenwal Inc.)

For free copy circle No. 1 on postcard, p. 139

Glass-Bead Finisher

A bulletin illustrates and describes a machine for peening, cleaning, and finishing by a patented process using specially treated minute glass beads. (Perfecto-Peen, Div. of Aero-Test Equipment Co.)

For free copy circle No. 2 on postcard, p. 139

Conveyor Control

A four-page folder explains a "flow control register" designed to permit numerical control of materials in a flow system. Among the functions performed are accurate lot counting, lot plus total registration, accumulation control, and remote control activation. (The Rapids-Standard Co., Inc.)

For free copy circle No. 3 on postcard, p. 139

Servovalves

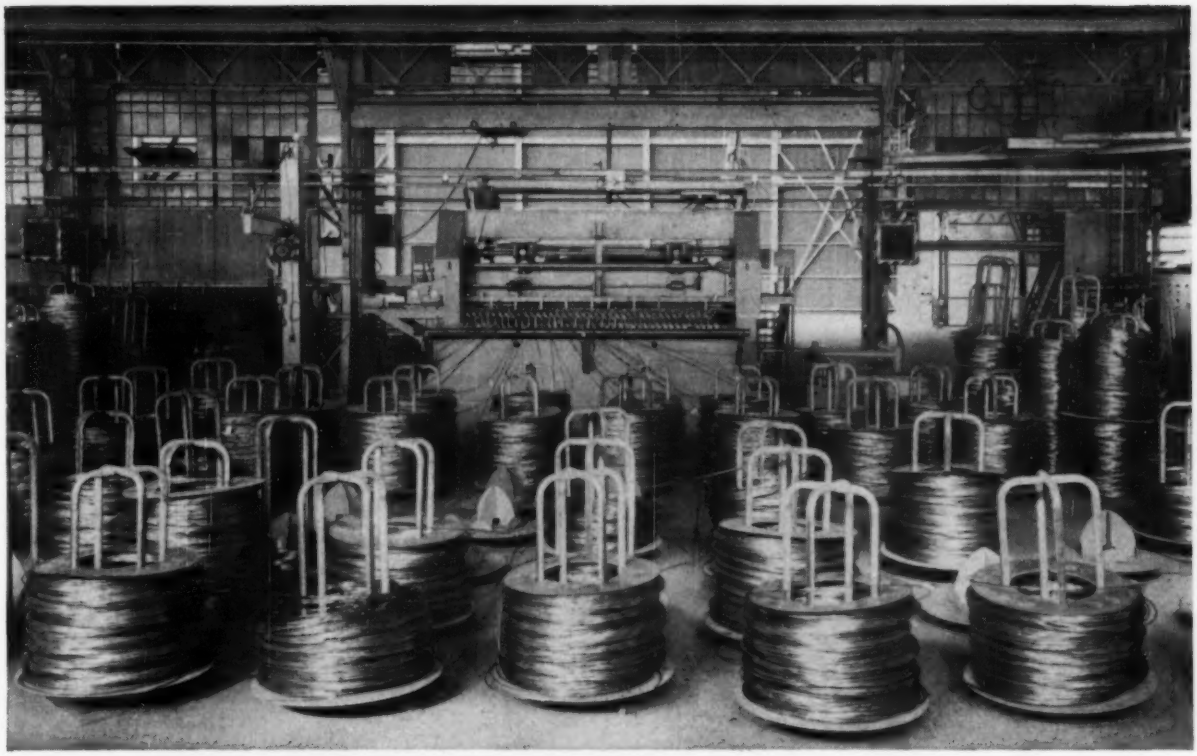
A product bulletin describes operation and performance characteristics of a new series of industrial servovalves. (Moog Servocontrols, Inc.)

For free copy circle No. 4 on postcard, p. 139

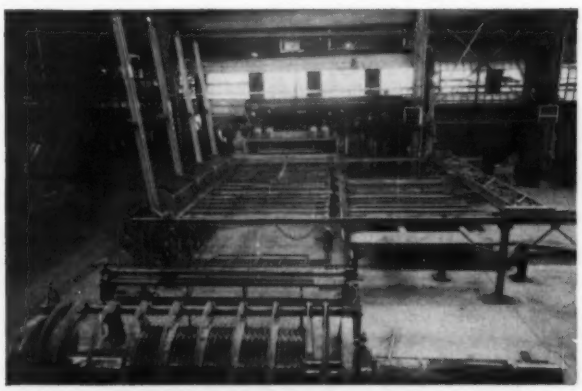
Gold-Plating Process

A seven-page technical paper discusses processes and acid-type electroplating formulations for producing hard, mirror-bright gold deposits of 22 to 23 karat, to any desired practical thickness. (Sel-Rex Corp.)

For free copy circle No. 5 on postcard, p. 139



Let DSC LPR COILS help cut your brite wire fabricating costs as they have done for our Portsmouth Division on Welded Wire Fabric



Look closely at the entry side of this giant Welded Wire Fabric machine. This one produces mesh in widths up to 13′, used for reinforcing concrete in road, pipe and other construction. Fed by as many as 80 - 3,000 pound Brite Wire LPR's running simultaneously off as many reels, it produces rolls from 300′ to 500′ long, weighing up to about 6,000 pounds. The flat mats or sheets run up to 30′ long.

In the photograph at the right, you see the delivery side of the welder, shear in the background, coiler in front and, in between, the fully automatic "flipper" and piler . . . the only one of its kind, we are told.

Our original purpose in developing continuous-length, long-production-run LPR's was to improve the efficiency of our own mesh operations. Compared with regular mill coils weighing about 300 pounds which we used previously, our 3,000 pound LPR's reduced downtime frequency by 90% and attendant coil-change and other costs proportionately.

PRACTICAL POINTERS on wireworking and complete information on DSC LPR's are available to you for the asking—call your nearest DSC Customer "Rep" office or write to Detroit Steel Corporation, General Sales Office, Box 4308, Detroit 9, Michigan.

FREE: Reprints of *"The Drawing and Handling of Long Production Run Wire Coils"* . . . a paper by Uno V. Johnson, Superintendent, Portsmouth Division Rod and Wire Mill, presented at the October Wire Association Convention . . . Send requests to Detroit Steel Corporation, Box 4308, Detroit 9, Michigan.

Customer Satisfaction Is Our No. 1 Job

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The PROOF of DSC **DETROIT STEEL**

is in its performance on your job

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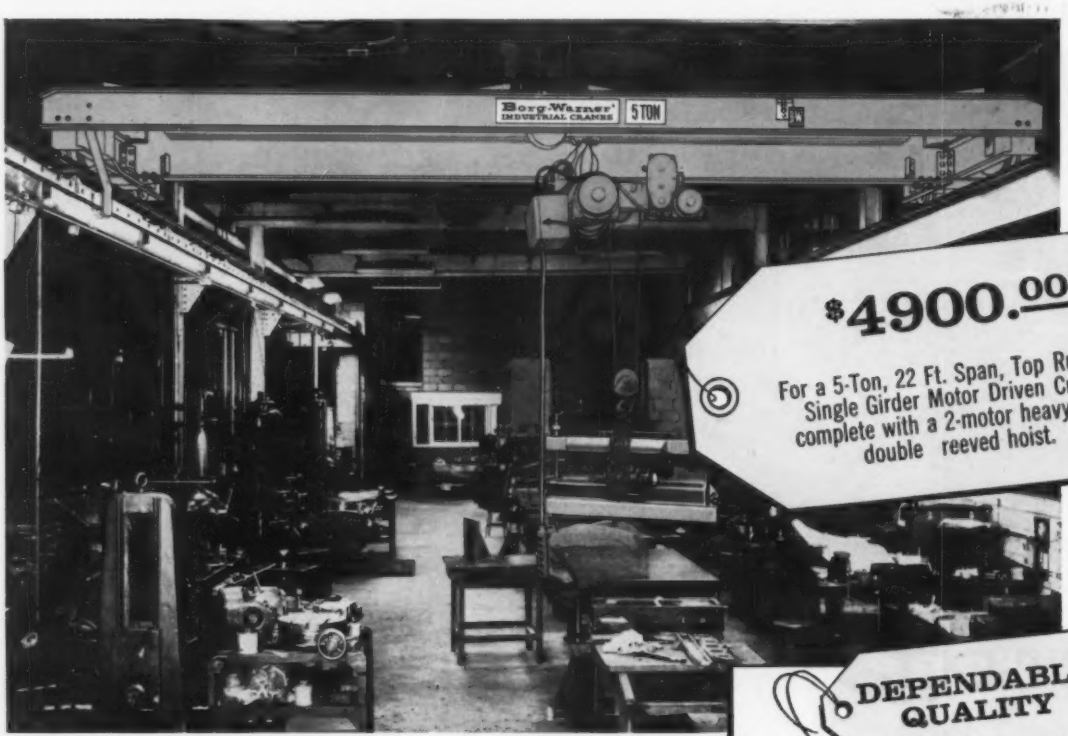
PRODUCTION WISE and COST CONSCIOUS!

Borg-Warner quality assures you of top value in every capacity, performance and price range



$4900.00

For a 5-Ton, 22 Ft. Span, Top Running Single Girder Motor Driven Crane complete with a 2-motor heavy duty double reeved hoist.

PRODUCTION WISE

There's no room in this busy shop area for aisle-filling floor-type handling equipment. But, an economical Borg-Warner 5-Ton Crane System transports materials and work swiftly, smoothly and quietly with minimum interference to production.

COST CONSCIOUS

Borg-Warner engineers and production men have made extensive use of interchangeable, standardized components resulting in real savings for you. You get more crane, more performance and greater dependability, for a smaller investment.

If you are planning on expansion or modernization, it will pay you to find out how Borg-Warner Industrial Cranes can supply you with the best values in overhead materials handling equipment.

DEPENDABLE QUALITY

- Full 5-ton rating with ample reserve capacity.
- Heavy duty Borg-Warner Motor Reducer Bridge Drive with integral fluid coupling.
- Heavy duty double reeved close headroom hoist.
- Heavy duty forged steel wheels.
- All welded, jig assembled, jig bored end trucks.
- Long life precision ball and roller bearings.
- Precision assembly of girder and end trucks with fitted bolts in reamed holes.
- Outrigger machinery girder construction.
- Full magnetic push button control.

ADVANCED DESIGN

The N-TRMD illustrated is a typical Borg-Warner Industrial Cranes Top Running Single Girder Motor Driven Crane. The precise equipment to meet your specific needs is available. Consult with Borg-Warner Industrial Cranes engineers.

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1510 S. PAULINA STREET, CHICAGO 8, ILLINOIS

Export Sales: Borg-Warner International, 36 South Wabash Ave., Chicago 3, Illinois

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Turret Threader

A six-page brochure describes an automatic single-point thread-chasing device for turret lathes. Attached to the cross-slide, it chases internal or external threads, straight or tapered or combinations of both. (Jones & Lamson Machine Co.)

For free copy circle No. 21 on postcard

Hydraulic Presses

A four-page bulletin illustrates and details a line of hydraulic presses capable of all normal press operations. They feature manual and automatic control of ram speeds, pressures, strokes, and action, and have ram pressures up to 75 tons. There are bench and floor models. (Denison Engineering Div., American Brake Shoe Co.)

For free copy circle No. 22 on postcard

Drum Handler

A new fiber and steel drum handler is covered in a four-page brochure. Apron-, fork-, or shovel-mounted on a lift truck, it is able to handle one or two drums at a time. (Little Giant Products, Inc.)

For free copy circle No. 23 on postcard

Steel Castings

A 20-page brochure describes a company's services and facilities for producing carbon- and alloy-steel castings, ranging in size from ½ to 3000 lb. (St. Louis Steel Casting Inc.)

For free copy circle No. 24 on postcard

Work-Holding Tools

A catalog features a complete line of work-holding devices. Included are many types of vises, plates, tables, milling attachments, and machine-tool accessories. (Chicago Tool and Engineering Co.)

For free copy circle No. 25 on postcard

Rotor-Jet Tank Cleaner

A two-page bulletin describes a rotary jet unit for tank cleaning. It produces a powerful hydraulic scrubbing action with solid streams of high-temperature liquid. Two jet nozzles rotate slowly in horizontal and vertical planes. (Sellers Injector Corp.)

For free copy circle No. 26 on postcard

Job Shop

A brochure describes a company's facilities for the manufacture of special machinery, tools, and precision components of all types. Design and engineering services are also offered. (General Machine Products Co., Inc.)

For free copy circle No. 27 on postcard

Fabricated Parts

A condensed catalog details a complete line of standard and special fabricated products. Included are metallic and nonmetallic washers, gaskets, packings, stampings, die-cut parts, shims, and spacers. Available production facilities are also listed. (L. J. Barwood Mfg. Co.)

For free copy circle No. 28 on postcard

Water Heater

A 20-page catalog describes a new scale-free, gas-fired, storage-water heater. Construction, operational principles, and specifications are covered in detail. (The Patterson-Kelley Co., Inc.)

For free copy circle No. 29 on postcard

Precision Chucking

A four-page brochure describes a line of precision chucking devices, to hold, center, and "round up" large-diameter precision components, such as missile nose cones, for inspection or machining. Of relatively simple construction, they are fast, accurate, and easy to use.

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **11/19/59**

Circle numbers for Free Technical Literature, Design Digest, or New Equipment:

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51	52	53	54	55	56	57	58	59	60
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Title .....

Product Manufactured .....

Company .....

Co. Address .....

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City ..... Zone .... State .....

FREE LITERATURE

Thus far, they have been built in 8- to 50-in.-diam sizes. (Pratt & Whitney Co., Inc.)

For free copy circle No. 30 on postcard

Scientific Instruments

A 112-page catalog details a line of over 300 scientific instruments. Included are such items as optical benches, cathetometers, galvanometers, and electron impact tubes. (Write on letterhead to The Ealing Corp., 40 University Rd., Cambridge, Mass.)

Cold-Heading Wire

A four-page brochure on stainless-steel cold-heading wire compares the cost, corrosion-resistance, and cold-heading characteristics of the commonly used grades. (Universal-Cyclops Steel Corp.)

For free copy circle No. 31 on postcard

Weld Fasteners

A four-page bulletin describes a line of self-locating weld fasteners. They provide load-bearing threads in thin sheets, and overcome the many common shortcomings of ordinary weld fasteners. They are available in steel and stainless. (Penn Engineering & Mfg. Corp.)

For free copy circle No. 32 on postcard

Air-Hydraulic Boosters

A 24-page engineering bulletin illustrates a line of air-hydraulic boosters and describes how they convert shop air into intensified (up to 10,000 psi and over) hydraulic pressures for operating cylinders and other devices. (Miller Fluid Power Div., Flick-Reedy Corp.)

For free copy circle No. 33 on postcard

Heat-Treating

A two-page data bulletin discusses the desirability of heat-treating metal thermostat parts, even simple flat blades, to redistribute the residual stresses, and stresses induced during fabrication. Method of treatment, recommended temperatures, and other pertinent considerations are included. (Metals & Controls Corp.)

For free copy circle No. 34 on postcard

Packaging Tips

A brochure describes corrugated packaging problems and solutions. Case histories concern a wide variety of packaged products. (Hoerner Boxes, Inc.)

For free copy circle No. 35 on postcard

Facilities Channel

A product bulletin describes a prefabricated channel designed to house all necessary plant power and facility lines—gas, electric, and liquid. Three in. wide, it comes in 5-ft modules. (Alden Systems Co.)

For free copy circle No. 36 on postcard

Stock Straighteners

A four-page brochure details a complete line of straighteners for small parts, thin coil, and wire. Full construction and capacity specifications on all models are included. (Durant Tool Supply Co.)

For free copy circle No. 37 on postcard

Counters for Machines

A folder describes the many advantages to be gained by including counting devices in the design of machinery. It describes a line of various counters—mechanical, electromagnetic, and photoelectric—for various counting jobs. (Veeder-Root Inc.)

For free copy circle No. 38 on postcard

Check Valves

Catalog sheets describe two new models of hydraulic check valves, both of the spring-loaded cone type and for in-line installation. One has flare ends, with a size range for ⅜- through 1¼-in.-OD tubing. The other has female pipe thread ports from ¼- through 1¼-in. sizes. Rated flow is 3 to 50 gpm, and maximum pressure is 3000 psi. (Parker-Hannifin Corp.)

For free copy circle No. 39 on postcard

Revere helps "fit the metal to the job"

AND A MAKER OF FINE CARS SAVES MONEY WHILE IMPROVING PRODUCT QUALITY

Recently, a manufacturer of top-flight motor cars was having trouble in producing the above escutcheon for the front bumper lamps used on his newest model.

First of all, the breakage of the part was excessively high. Second, the escutcheon which is drawn at an angle, and contains a concave surface on the inside presented a problem in that, after buffing, polishing, and flash plating, the finish produced did not exactly match the chrome-plated bumper.

Revere's Technical Advisory Service suggested these difficulties might be overcome by using Revere 70-30 Brass Strip.

Here, again, by "fitting the metal to the job" Revere's Technical Advisory Service was able to reduce manufacturing costs while improving the quality of the product. Finish of parts was improved while finishing costs were reduced. Finished parts proved an excellent match. Switching to the more ductile metal resulted in less tool wear, while breakage was reduced to less than 1%. All this with little adjustment of existing press equipment.

Why not consult with Revere's Technical Advisory Service and take advantage of its extensive knowledge in "fitting the metal to the job." This Service has saved others money, why not you?

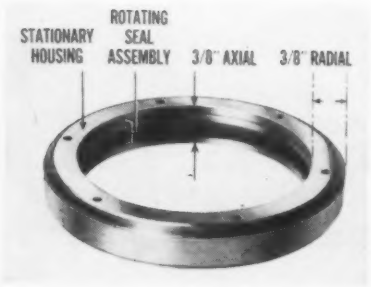
COPPER • BRASS 18 01 REVERE ALUMINUM

REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801
230 Park Avenue, New York 17, N. Y.

Mills: Rome, N.Y.; Baltimore, Md.; Chicago, Clinton and Joliet, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Brooklyn, N.Y.; Newport, Ark.; Ft. Calhoun, Neb. Sales Offices in Principal Cities. Distributors Everywhere.

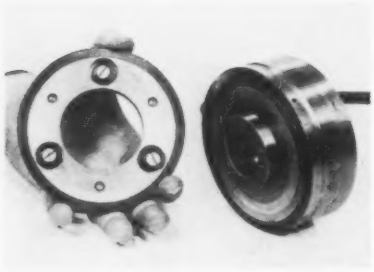
New Materials and Components



Mechanical Seal Cuts Wear, Retains All Fluids

A self-contained mechanical seal for temperatures to 450°F resists pressure differentials in one or both directions to 30 psi at shaft speeds to 15,000 sfpm. Compact, it requires little axial space. It comes for shaft sizes from ½- to 8-in. diam, and retains water, gases, and any type of lubricant. Two-point static shaft contact eliminates shaft scoring or wear, and compensates for normal end play and whip. It is designed for press fit in the housing cavity by various methods. (The Universal Grinding Corp.)

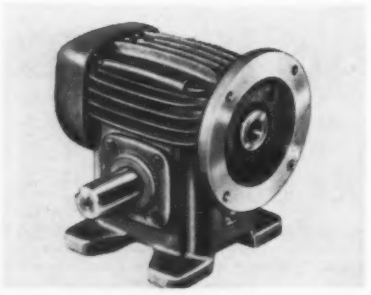
For more data circle No. 40 on postcard, p. 139



Face-Tooth Clutches Give High Torque, No Slip

A new series of stationary-field face-tooth clutches provide high torque in a small space for such uses as machine-tool feed, tracer, and positioning drives. They come in five ratings, 30 through 725 lb-ft, for 24- or 90-v dc use. They feature rapid action and minimum backlash, and the fine-tooth profile affords very low angular displacement on repetitive engagements. The multiplicity of fine teeth make them ideal for precision feed drive and positioning applications. (I-T-E Circuit Breaker Co.)

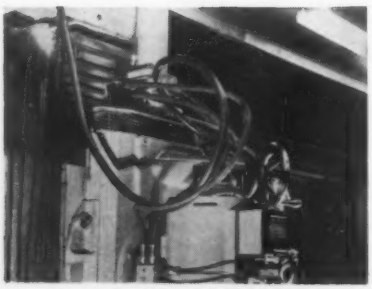
For more data circle No. 41 on postcard, p. 139



New Fin- and Fan-Cooled Speed Reducers

New fin- and fan-cooled speed reducers are available with either of two types of "C" flanges. One permits direct connection to the motor shaft. The other has a bell-shaped flange to accommodate a flexible motor coupling between drive motor and input shaft. Cooling provides up to 80 pct more capacity than comparable non-ventilated reducers. They are available in a complete range of sizes from 1.33- to 5.25-in. center distance. Horsepower ratings range from 1/16 to 18. (The Ohio Gear Co.)

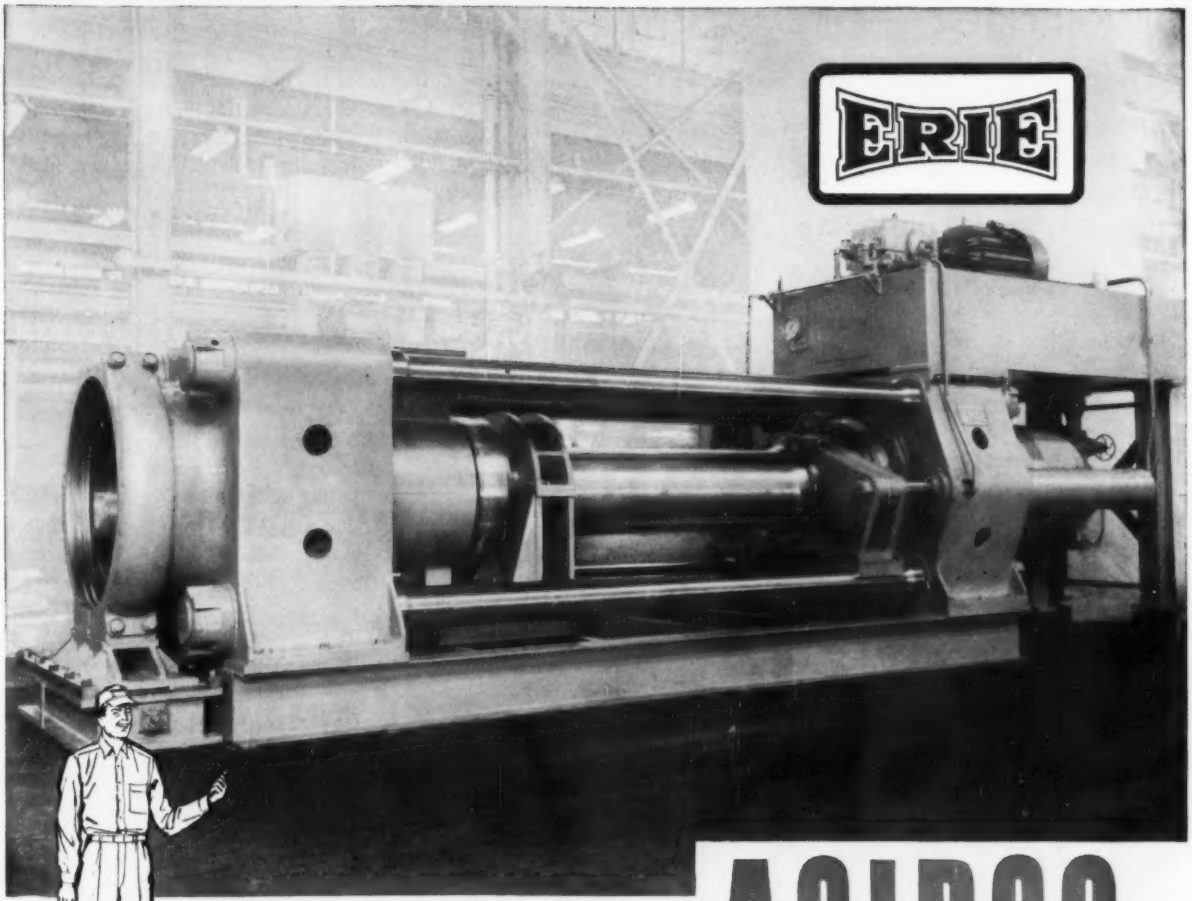
For more data circle No. 42 on postcard, p. 139



Nylon Hydraulic Tubing Is More Flexible

A nylon pressure tubing allows smaller size and increased flexibility for hydraulic applications. Easy to install, it can be cut, cold-flared, bent, and connected on the spot, with any ordinary metallic fitting. Lighter in weight and stiff enough to hold shape, it is neater when used in long runs. Considerably smaller in OD than braided rubber hose of the same ID, it is ideal for compact hydraulic systems. Smaller fittings can be used, and tighter connections can be made. (The Polymer Corp. of Pennsylvania)

For more data circle No. 43 on postcard, p. 139



another special from ACIPCO

ERIE FOUNDRY CO. PICKS ACIPCO TUBING FOR CARBON EXTRUSION PRESS PLUNGER

You're looking at a new 2000-ton horizontal carbon extrusion press manufactured by the Erie Foundry Company's hydraulic press division. Designed for the production of carbon electrodes, the press features ACIPCO centrifugally spun steel tubing in its main ram plunger.

Custom-spun by ACIPCO, the plunger is 30.50" O.D. with 125 micro-inch finish and 2-5/8" wall thickness. Main ram is 42" in diameter and has a 105" stroke. Produced with heads statically cast at ACIPCO, the plunger's overall length is 144".

Fabricated applications such as this are a specialty with ACIPCO. Completely equipped to solve a wide variety of tubing problems, ACIPCO can serve your needs more efficiently and economically because all its facilities are under one roof. For expert consultation on centrifugally spun tube applications in your field . . . call on ACIPCO.

VERSATILE ACIPCO CENTRIFUGALLY SPUN STEEL TUBES

SIZE RANGE: Lengths up to 410" to meet modern machinery requirements have been produced. OD's from 2.25" to 50"; wall thicknesses from .25 to 4".

ANALYSES: All alloy grades in steel and cast iron, including heat and corrosion resistant stainless steel, plain carbon steel and special non-standard analyses.

FURNISHED: As cast, rough machined, or finished machined, including honing. Complete welding and machine shop facilities for fabrication.

SPECIAL PRODUCTS DIVISION

AMERICAN CAST IRON PIPE CO.

BIRMINGHAM 2, ALABAMA

Cold-Bending Magnesium

Availability is announced of magnesium cold-bending sheet from coil stock. It is designed for uses requiring good cold-bending characteristics at room temperature. Critical bends can easily be formed cold, eliminating the need for heated dies in many cases. The material can be bent without cracking through a 90° angle around a mandrel radius equal to the bend factor times the nominal sheet thickness. Bends can be made parallel or perpendicular to the direction of rolling. (The Dow Metal Products Co.)

For more data circle No. 44 on postcard, p. 139

Mold Wash

A new mold wash is especially effective in reducing the number of flaws introduced during the teeming of steel ingots. A dry, free-flowing black power, it is dispersed in water at the steel mill. It is easily sprayed on mold surfaces, and facilitates the complete release of the molten metal from the mold walls, preventing accumulation of curtains and splashes on the wall which cause folds, scabs, and other defects. It also reduces damage to molds. (Silicones Div., Union Carbine Corp.)

For more data circle No. 45 on postcard, p. 139

Stainless Steel

A new straight chromium stainless strip called Uniloy 435 provides better workability in stretch bending and deep drawing. Surface characteristics and corrosion resistance are equal to those of the manufacturer's Type 430. (Universal-Cyclops Steel Corp.)

For more data circle No. 46 on postcard, p. 139

"Utility" Ball Bearings

Made from high-carbon steel, a "utility" line of ball bearings permit considerable cost savings in comparison with similar-sized precision bearings, in applications where such bearings are not really required. (Global Ball & Bearing Co.)

For more data circle No. 47 on postcard, p. 139

Zinc-Base Dies

A zinc-base forming alloy operates very successfully in dies for metal-stamping operations which formerly required steel dies. These dies are tougher and require less frequent replacement than conventional dies. The alloy is readily adaptable for short-run operations on steel parts and on aluminum details involving large quality runs and difficult or critical sections.

WAPAK SLITTERS

Photo courtesy of Stamco Inc., New Bremen, Ohio

SINCE 1891

Mirror Finish and ULTRA-KEEN EDGES reflect LOWER PRODUCTION COSTS

Longer continuous runs with less down-time are obtained with WAPAK Slitters and Rotary Shear Knives, because they're designed for high-speed cutting and trimming. Precision inspected by visual gage and profilometer.

Wapakoneta, one of the oldest and largest machine knife manufacturers in America, assures you of the exact heat treatment and grinding specified for your needs. Thickness and parallelism tolerances of .0002 or closer if required.

Use WAPAK MULTICUT for maximum production. WAPAK TUFCUT is engineered for shock-resistant cutting of heavy stock.

Export Div.: 30 Church St. New York 7, New York

WAPAK KNIVES

THE WAPAKONETA MACHINE CO., WAPAKONETA 11, OHIO

Knives Engineered for the Job Since 1891

SLITTER KNIVES • SHEAR BLADES • SCRAP CHOPPERS • HARDENED SPACERS • GIBS • HARDENED WAYS • ROCKER PLATES • WEARING PLATES • MACHINE LINERS

PACIFIC METALS CO., LTD.
STEEL SALES CORPORATION
WILLIAMS & COMPANY, INC.
J. M. TULL METAL & SUPPLY CO., INC.
WHITEHEAD METALS, INC.
There when you need it...

...VCA Distributor Service — When you're in a hurry for warehouse quantities of alloys, there's a VCA distributor near you who can meet your needs completely — and *fast!* In warehouses all across the country, adequate stocks of Vancoram products are on call. Next time get the big benefits of VCA service, plus the bonus benefits of Vancoram *extra* quality! Vanadium Corporation of America, 420 Lexington Avenue, New York 17, N. Y. • Chicago • Cleveland • Detroit • Pittsburgh

Vancoram products are distributed by:

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J. M. TULL METAL & SUPPLY CO., INC.
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Pittsburgh, Cleveland, Cincinnati Columbus, Toledo

VANCORAM

VANADIUM CORPORATION OF AMERICA

HERE'S A HELPFUL AND CONVENIENT REFERENCE SOURCE

for ***COMPARATIVE SPECIFICATIONS***
CHEMICAL ANALYSES
MINIMUM PHYSICAL PROPERTIES

...clearly charted in SHENANGO'S new Bulletin No. 157

This invaluable chart of nonferrous alloys centrifugally cast by Shenango is readily available upon request. For your free copy, write to this publication or the Centrifugally Cast Products Division, The Shenango Furnace Company, Dover, Ohio.

SHENANGO CENTRIFUGAL CASTINGS

COPPER, TIN, LEAD, ZINC BRONZES · ALUMINUM AND MANGANESE BRONZES
MONEL METAL · NI-RESIST · MEEHANITE METAL · ALLOY IRONS · DUCTILE IRON

DESIGN DIGEST

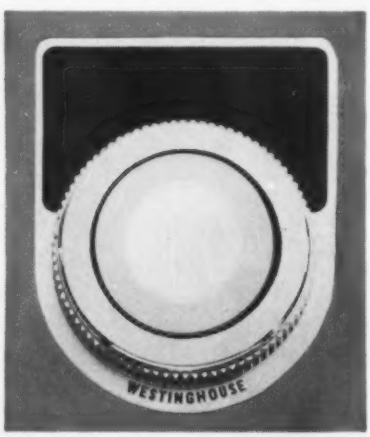
Time and cost savings result. (Federated Metal Div., American Smelting and Refining Co.)
For more data circle No. 48 on postcard, p. 139

Patching Brick

Basic refractory patching bricks for furnace roofs have mating slots and recesses and permit insertion of support clips for positive support. This allows doing away with cumbersome tie-rods, and brings installation cost savings. A large variety of installation arrangements is possible. (Harbison-Walker Refractories Co.)
For more data circle No. 49 on postcard, p. 139

Oiltight Pushbuttons

A line of low-silhouette oiltight pushbuttons can be used to control any electrical machinery and equipment. They are sealed tight against



oil, coolant, cutting oil, or water, insuring dependable circuit operation. They feature interchangeable color caps to permit coding different functions. (Westinghouse Electric Corp.)
For more data circle No. 50 on postcard, p. 139

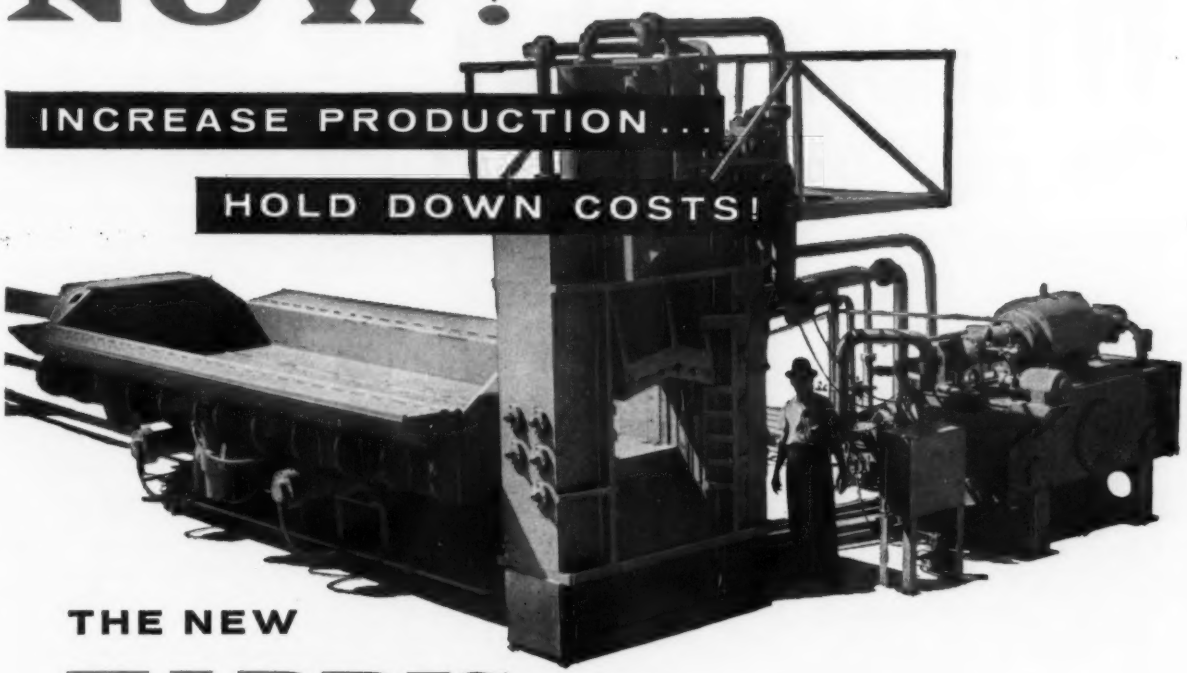
Black-Oxide Finisher

An "activated" process has been developed for producing a black oxide finish on steel. It reduces processing time and lowers salt consumption, is free-rinsing, and produces a denser black and clean finish. Dragout is less, also. The finish produced has more corrosion

MODERNIZE NOW!

INCREASE PRODUCTION...

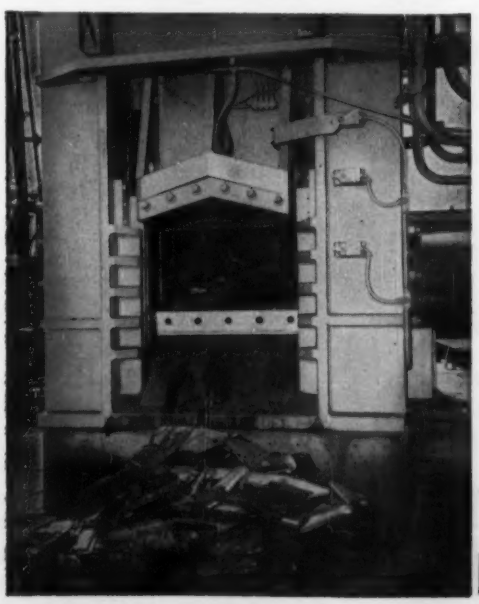
HOLD DOWN COSTS!



THE NEW

HARRIS BS-350 BALER-SHEAR

AUTO FRAMES and bulky scrap work through easily. The Harris Baler-Shear was designed to eliminate problems arising from the preparation of bulky scrap. It incorporates the principles of baling and shearing.



SPECIFICATIONS

size of charging box	264 x 83 x 41"
shear opening height	20"
shear opening width	36"
shear force	350 tons
floor space required	55' x 20'

HARRIS FOUNDRY & MACHINE CO.

Hyoraulic Engineers Since 1889

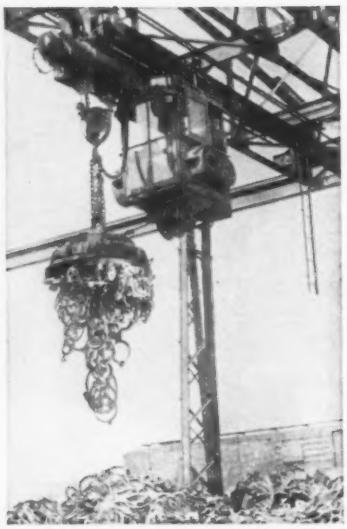
CORDELE, GEORGIA

Talk with a Man from Harris

WHICH HOIST fits your plant's needs?

SHEPARD NILES
FLOOR-OPERATED HOIST

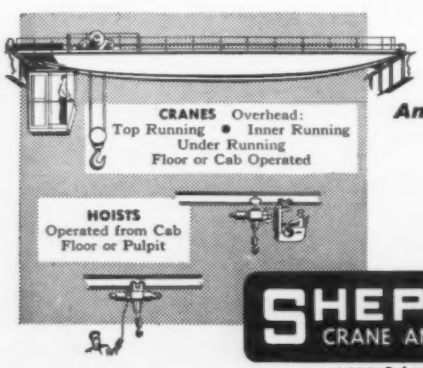
Operator primarily occupied with other duties. Uses hoist for fast, efficient handling of relatively short hauls.



SHEPARD NILES
CAB-OPERATED HOIST

Operator in cab moves loads along at high speeds, occupies best vantage point for spotting and stacking material.

THE RIGHT HOIST . . . can reduce your plant's handling costs. But which one is best for the job . . . a floor-operated hoist where the operator is freed for other duties or a cab-operated hoist where he is engaged fulltime moving loads through the air? Because Shepard Niles manufactures both types of hoists . . . as well as a complete line of cranes . . . we can approach your handling problem with an open mind.



● Send for Bulletins describing Shepard Niles Cab and Floor-Operated Hoists. And request our representative to call.

America's Most Complete Line of Cranes and Hoists Since 1903

SHEPARD NILES
CRANE AND HOIST CORPORATION
1488 Schuyler Ave., Montour Falls, N. Y.

DESIGN DIGEST

resistance. It operates in a single bath with one chemically balanced salt for additions to the blackening solution. (The Mitchell - Bradford Chemical Co.)

For more data circle No. 51 on postcard, p. 139

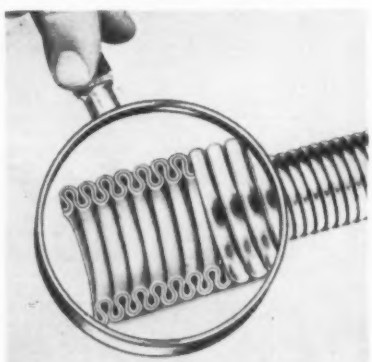
Mold Release Oil

A mold release oil for diecasting prevents adhesion of casting metal to the die mold, gives bright casting surfaces, and produces diecastings with less porosity. Applied by spraying, it develops comparatively less fog, and gives excellent lubrication which minimizes wear on guide pins and bushings. (Sun Oil Co.)

For more data circle No. 52 on postcard, p. 139

Flexible Metal Hose

A multiple-ply, flexible, corrugated metal hydraulic hose is reliable from —450° to 1200°F, and stands up under cyclic hydraulic shock loading up to 4500 psi. Outer

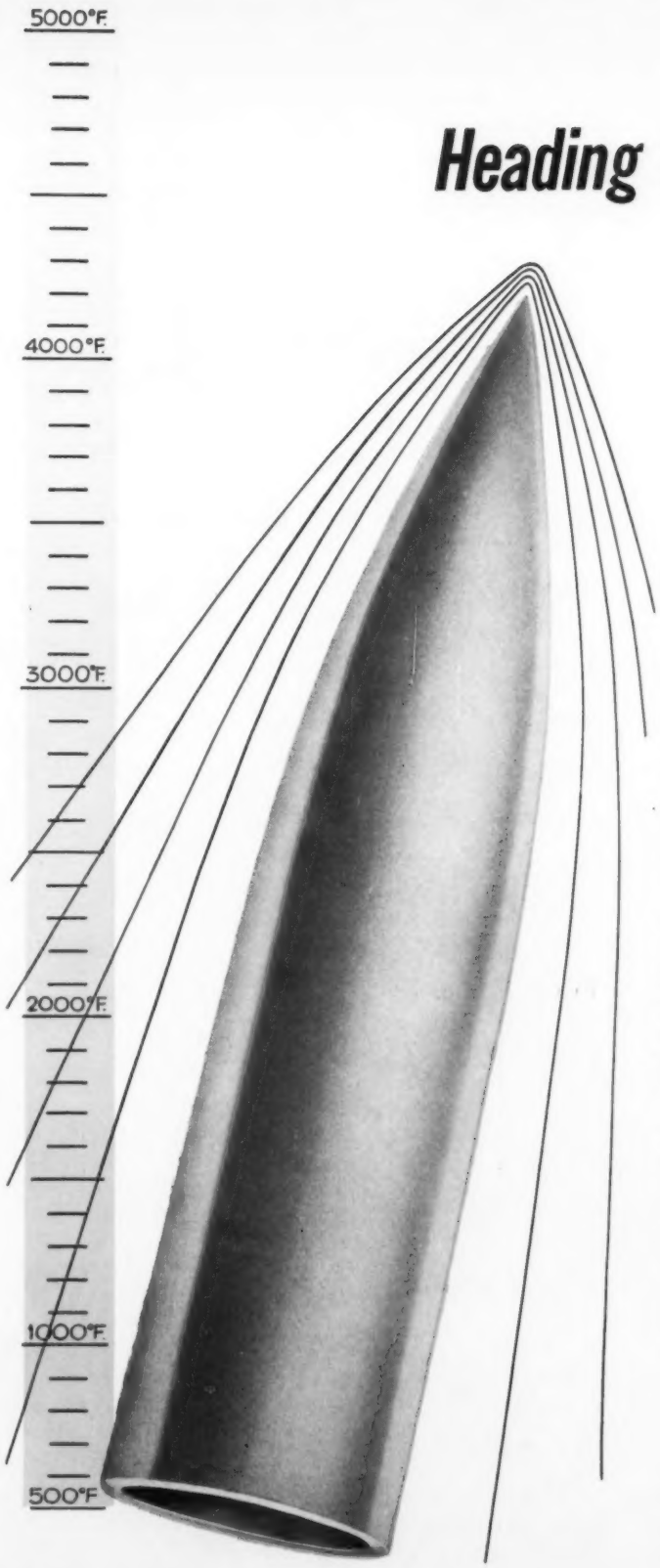


and inner plies are stainless steel, and the center ply is a metal of high damping capacity, such as copper, to dissipate vibration. It is available in ¼- to 2-in. diam. (Flexonics Corp.)

For more data circle No. 53 on postcard, p. 139

Hardfacing Rods

Copper-coated tube rods are available for semiautomatic open-arc hardfacing. They come in 7/64-in. diam, coiled, in the following materials: "Haynes" 90, 94, 4560; "Haynes" Nickel-Manganese; "Hascrome"; and "Haystellite." There is an internal flux to permit open-arc



Heading for the unknown?

Check your processing requirements against Norton Fused Zirconia

You can't predict tomorrow's processing requirements. However, you can be prepared to meet many of them more efficiently and economically . . . with Norton *Lime-Stabilized* Fused Zirconia.

Consider Its Unusual Characteristics

Extremely high melting point (4,620°F) coupled with a lower thermal conductivity than standard dense refractories • Excellent resistance to thermal shock and abrasion • Not wet by most metals • Moderate electrical insulator at low temperatures and conductor above 2,200°F • Good stability in either oxidizing or reducing atmospheres.

Consider Its Many Applications

As potential material for use in missiles and reaction motors • As a support for firing highly-reactive titanates • As lining for furnaces containing high temperature gaseous reactions • For furnace parts and linings used in the metals industry • As lining and packing media for high temperature air heaters and heat exchangers • For many other critical processes.

Chances are you can improve both your processing and your production economy with this rugged, versatile material. Let a Norton Sales Engineer help. He's well qualified to discuss your precise requirements. Write to NORTON COMPANY, Refractories Division, 210 New Bond Street, Worcester 6, Mass.

Note: Norton *Lime-Free* Fused Zirconia is also available for the manufacture of refractories, as a source material for zirconium for chemicals and metals, or as an opacifier for glazes and enamels.

Melting Point	4,620°F
Maximum Usable Temperature	4,450°F
Chemical Nature	Stable
Electrical Resistivity	High Temperature Conductor
True Specific Gravity	5.6 — 5.7
Two Grain Types	Hard Dense Grains Bubble-Type Grains

NORTON
REFRACTORIES
Engineered . . . Rx . . . Prescribed

Making better products . . . to make your products better

NORTON PRODUCTS Abrasives • Grinding Wheels • Grinding Machines • Refractories • Electrochemicals — **BEHR-MANNING DIVISION** Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

deposition and insure a sound, slag-free deposit. (Haynes Stellite Co.)
For more data circle No. 54 on postcard, p. 139

Stainless Cap Screws

A line of cold-forged stainless-steel cap screws feature extra strength; ideal grain flow (which permits greater tightening torques); clean, chip-free sockets; and rolled threads for perfect fit. They come in many sizes in the new ASA 60 series or the old series. (Set Screw & Mfg. Co.)
For more data circle No. 55 on postcard, p. 139

Rectangular Tubing

Rectangular steel tubing (butted), cold-rolled from coil stock, is available in sizes from 2 x 3 to 2 x 5 in., in 12-gage, in lengths of 24 and 30 ft. Sizes from 2 x 5½ through 2 x 7 in. come in 11-gage, in 30- and 35-ft lengths. Special sizes can be made on request. (Bock Industries, Div. of Elkhart Welding & Boiler Works, Inc.)
For more data circle No. 56 on postcard, p. 139

Gage Control

An automatic gage control for steel strip mills operates directly from an X-ray gage signal. Screwdowns are automatically reset at the end of each strip by use of a digital position control. An associated device records gage data for each coil. (Allis-Chalmers Mfg. Co.)
For more data circle No. 57 on postcard, p. 139

Solenoid Valves

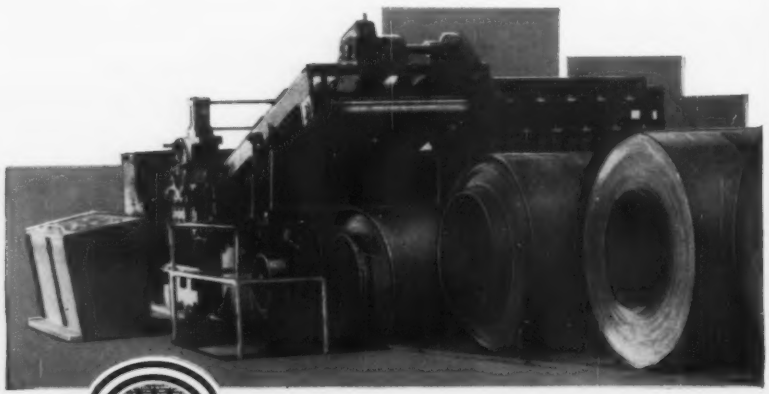
New high-pressure models are added to a line of two-way, pilot-operated solenoid valves. They come in two-way, normally closed construction in a wide range of voltages and frequencies with many

electrical options. Orifice size is ¼ in. with ¼-in. NPTF ports. Pressure differentials are 5 to 1000 psi. They handle all common media. (Skinner Electric Valve Div., Skinner Chuck Co.)
For more data circle No. 58 on postcard, p. 139

Motor Pulleys

Pulleys are available for a line of variable-speed drive motors in sizes from 1 to 15 hp. They feature a single lubrication point, free distribution of grease to bearing points, and a grease reservoir. They are simply designed with a single movable flange and totally enclosed separate spring cartridges. (Worthington Corp.)
For more data circle No. 59 on postcard, p. 139

Stamco **heavy gauge feeding equipment and trimmers** save you money. Saves operating time and increases production. A single operator can quickly feed gauges up to ½" thick with Stamco electrically and hydraulically operated coil strippers and unwind equipment.



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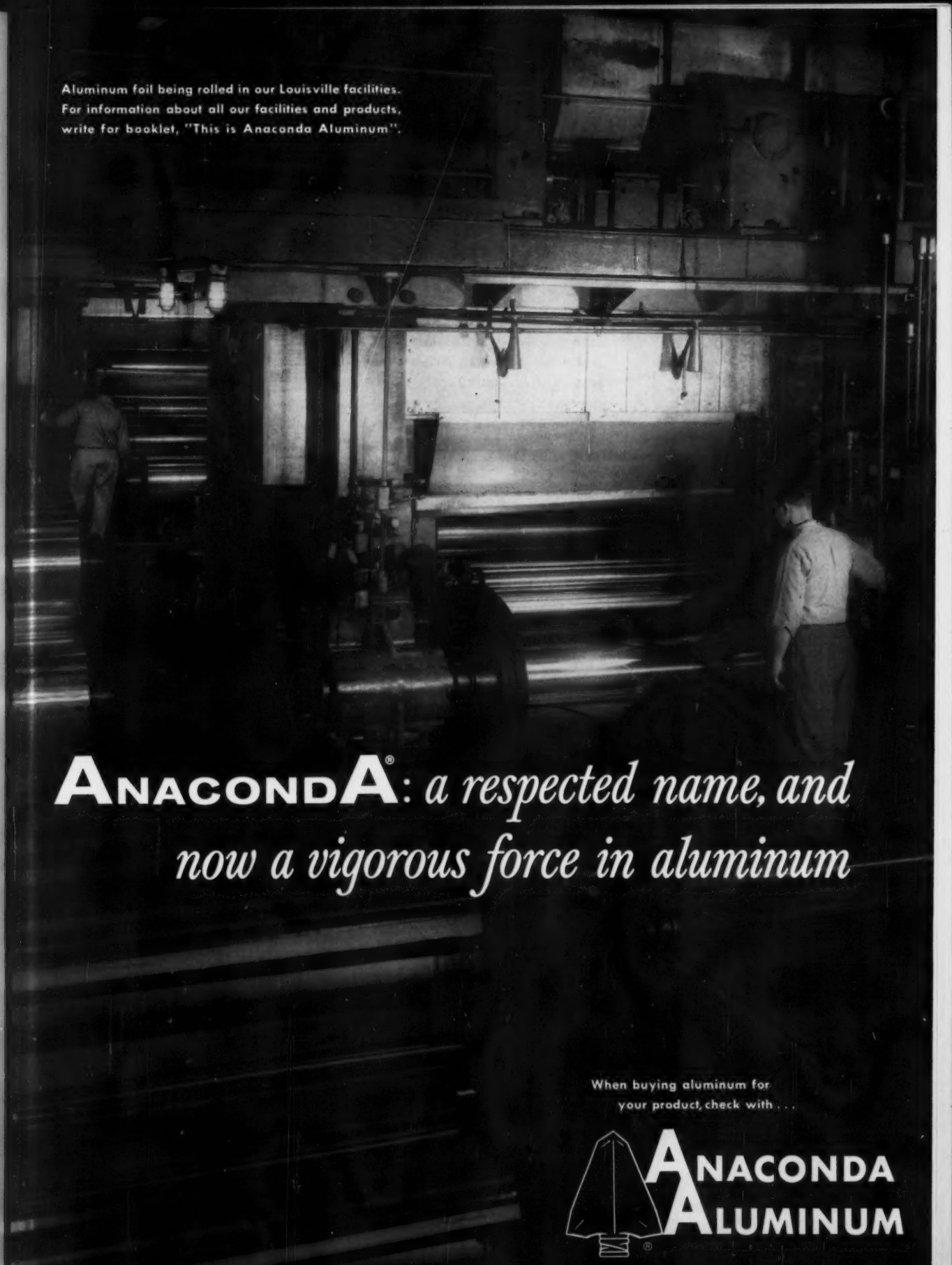
Stamco, Inc.
New Bremen, Ohio, U. S. A.

Slitting and Coiling Lines • Cut-To-Length Lines • Flying Shear Lines • Power Squaring Shears • Automatic Resquaring • Corrugating, Culvert and Steel Mill Equipment



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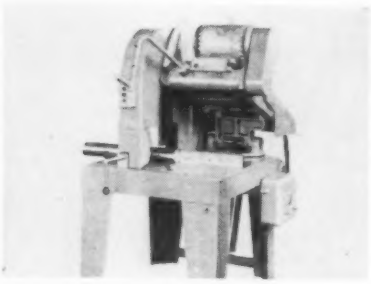
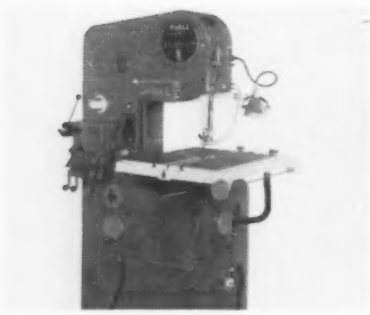
New Equipment and Machinery



Abrasive Machine Does Fast Quality Cutting

A dry abrasive cutting machine cuts practically all metals at 2 to 3 seconds per sq in. Wheel oscillation insures quality cuts on large cross-sections. Capacity is 4-in. solids, 5½-in.-OD pipe or tube, 6 x 1-in. flats, 6-in. angle iron, and 8-in. channel iron. Low in cost and economical to operate, it is designed for heavy-duty work of all kinds. It is equipped with a special 10-hp high-torque motor and a 20 x ⅛-in. abrasive cutting wheel. (Allison-Campbell Div., American Chain & Cable Co., Inc.)

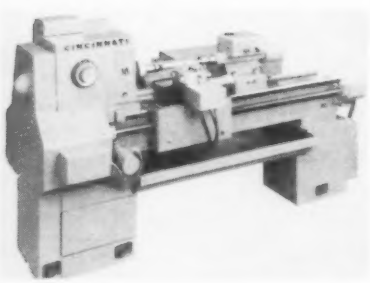
For more data circle No. 60 on postcard, p. 139



Band Machines Are Redesigned for Heavier Duty

Pictured is one model of a redesigned line of band-saw machines. Throat depths are 16, 26, 36, and 60 in., work height 13 in. (12 in two cases). Increased band capacity suits them to use with a heavy-duty type HSS band. Those models designed principally for production work have power-feed work tables and circulating coolant systems. Every machine has a job selector to aid choice of speed and feed. Heavier-capacity band welders are included. Smaller models have 3 hp for up to 6000 fpm band speed; 7½ hp gives larger models a range to 9000 fpm. (The DoALL Co.)

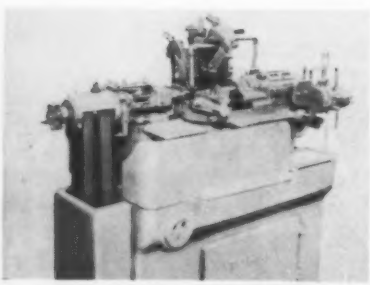
For more data circle No. 61 on postcard, p. 139



N-C Lathe Allows Fast Work and Changeover

Tight tolerances are easily held and changeover times are very fast on a numerically controlled lathe. It uses a point-to-point tool-positioning control designed specifically for step turning. An indexing six-station tool turret necks, chamfers, and turns varying diameters, both toward and away from the headstock, in a completely automatic cycle. Selection of speeds and feeds, tool sequence and positioning, and length and depth of cut are all tape-programmed. (Cincinnati Lathe and Tool Co.)

For more data circle No. 62 on postcard, p. 139



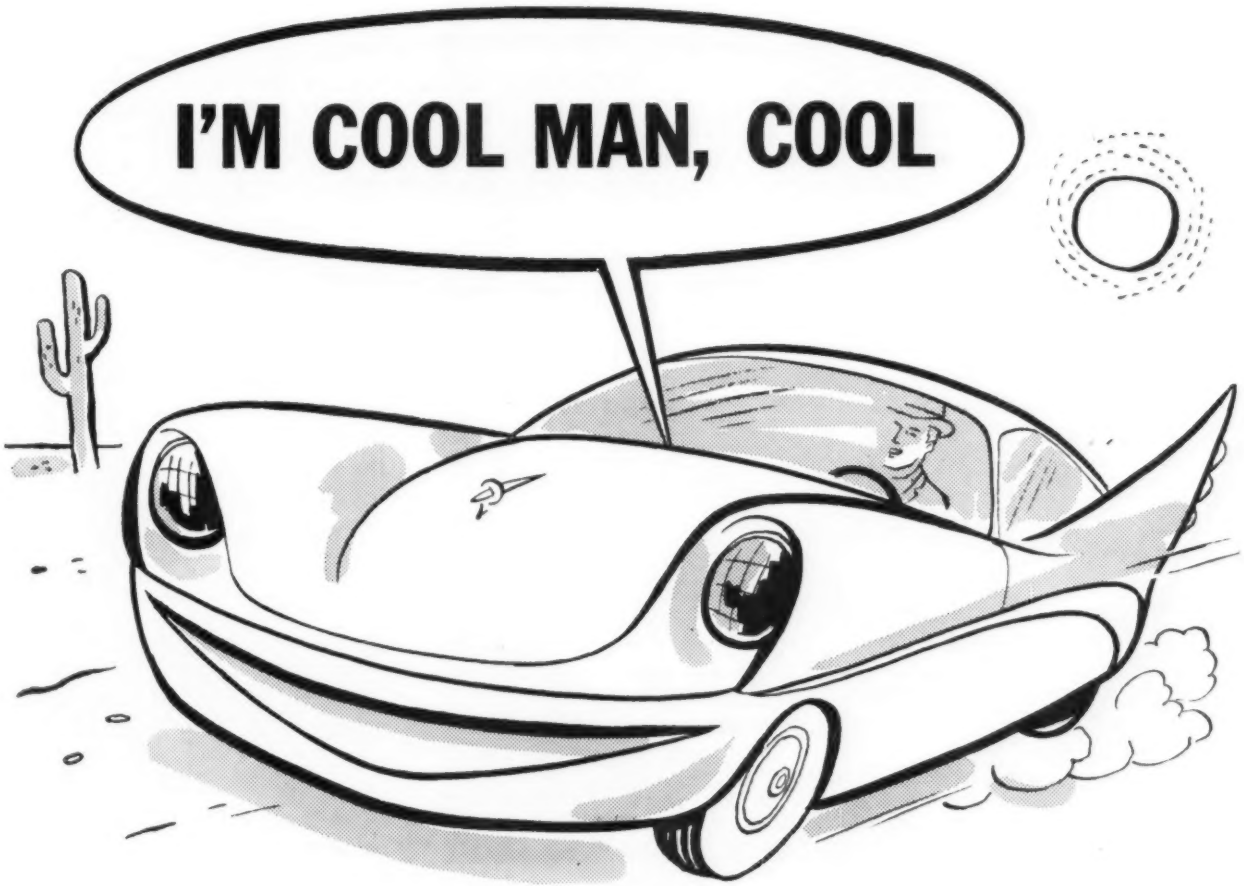
New Swiss Automatic Has Increased Capacity

The new Tornos R125 Swiss Automatic Lathe boasts 10,000 rpm and ½-in. capacity. It also features guided attachment seats, instantly adjustable headstock bearings, single-lock toolposts, and an infinite combination of second-operation accessories. Turning lengths in one chucking are 2¾-in. with a plate cam, and 4 in. with a bell cam. Maximum threading diameter is ¼ in. for steel, 5/16 for brass. There are 28 spindle speeds and 40 camshaft speeds for each spindle speed. (Carl Hirschmann Co., Inc.)

For more data circle No. 63 on postcard, p. 139

AUTO AIRCON STEEL CABLE V-BELTS
from the POWER UNLIMITED complete belt line

I'M COOL MAN, COOL



The U. S. Auto AirCon Steel Cable V-Belt has everything required in a belt for air-conditioning use. Here is a V-belt that's in a class by itself. It is equipped with pulling cords of steel. A new patented curing method and electronic tensioning of the steel cords *free this belt from vibration.* It transmits power smoothly, quietly and efficiently—in present automotive air-conditioning service, lasts 1½ to 2½ times longer than any other V-belt. Here are the unequalled advantages the engineers point out:

- All steel cable members lie in the same plane.
- Wire cable members are straight, never wavy.
- Absolute uniform top width and belt thickness for better seating in pulley.
- Perfect dynamic balance.
- Use of knurled mold insert provides maximum traction and alignment of outside idler.

Our field engineers stand ready to consult with you on any or all V-belt problems. Drop us a line at address below.

• • •

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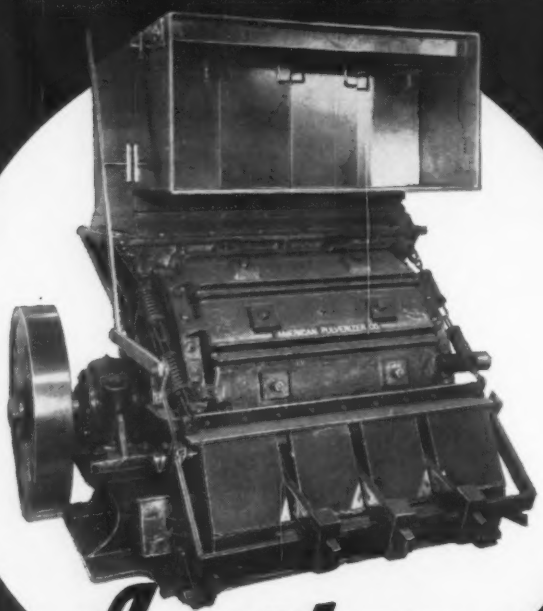
CASH IN YOUR CHIPS

Change Metal Turnings Waste into More Profitable Shoveling CHIPS



American METAL TURNINGS CRUSHERS

No progressive, profit-conscious company—who produces 10 or more tons of metal turnings per month—can afford to ignore the profit potential of a modern chip salvage system . . . with an American Metal Turnings Crusher at the core.

American installation profits include: $4 more per ton for chips than for machine turnings; up to 50 gallons per ton in cutting oil recovery; 75% less storage; easier, faster handling.

How many profit dollars are you losing under present operations? If, for example, you're currently producing 20 tons of turnings a month . . .

THIS COULD BE YOUR PROFIT STORY FOR NEXT YEAR!

240 Tons Metal Turnings per Year (20 tons/month at $4 extra per ton)	$ 960.00
6,000 Gallons Recovered Cutting Oil at 30¢/Gal. (50 gals. per ton x 240 tons = 12,000 gals. Half of this, 6,000 gals., can be credited to use of chips instead of turnings in reclamation)	$1,800.00
Estimated Savings in Manpower, Storage, Tools, Maintenance, Freight, etc.	$ 300.00
TOTAL GROSS PROFIT	$3,060.00

WRITE for Metal Turnings Crusher Bulletin.

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1439 MACKLIND AVE. • ST. LOUIS 10, MO.

NEW EQUIPMENT

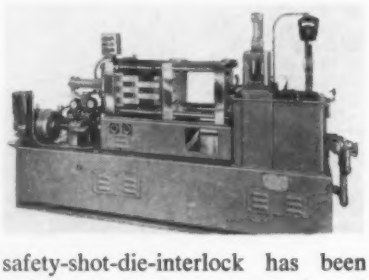
Precision Presses

A new line of high-production presses are rugged and precision-built to make them both sensitive to delicate jobs like straightening, and reliable for heavy broaching, riveting, forcing, marking, swaging, or complex special operations. They offer variable speeds and fingertip control, as well as optional automatic or seimautomatic controls. They have capacities from two to several hundred tons. (Detroit Broach & Machine Co.)

For more data circle No. 64 on postcard, p. 139

Diecasting Machine

Standard equipment in a company's Model 150Z Hot Chamber Diecasting Machine now includes a 950-lb melting pot and a new gooseneck design for long life. The



safety-shot-die-interlock has been redesigned for better protection of the operator. Die platens are 20 x 12 in. Zinc capacity is up to 500 4-lb shots per hour. (American Die Casting Machinery Co.)

For more data circle No. 65 on postcard, p. 139

Wheel-Dressing Tools

Diamond wheel-dressing tools contain a concentration of selected, whole natural diamonds. They are made to user specifications for better efficiency and economy in dressing form, straight-face, and thread-grinding wheels. (Wheel Trueing Tool Co.)

For more data circle No. 66 on postcard, p. 139

Lathe Tape Control

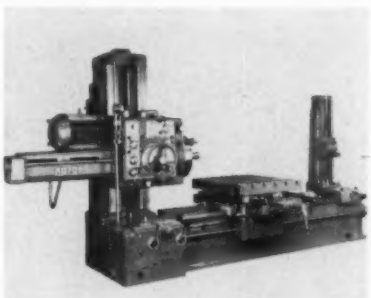
Application of positioning controls for turning, facing, and boring has been made by a company to

its Series EE, Model 1000 Lathe. A console provides tape control through a modified General Electric Mark II unit. Accuracies of 0.001 in. on both diameter and length are achieved. Provision is retained for reverting to manual control. (The Monarch Machine Tool Co.)

For more data circle No. 67 on postcard, p. 139

Horizontal Boring Mill

Availability is announced of the Heavy-Duty Table-Type 3-in. Pasquino Horizontal Boring Mill (Italian). A direct-driven nitrided and ground spindle runs in roller bearings at both ends for superb rigidity.

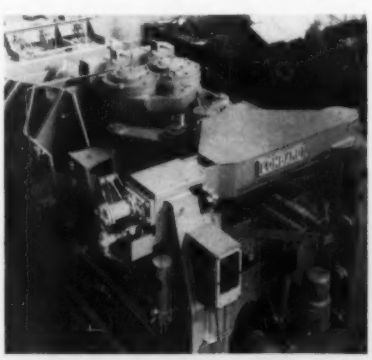


There are 16 speeds from 12.5 to 1500 rpm, and 16 feeds. The table is rotary type. Rapid traverse in all directions of all movable components is featured. Automatic lubrication is included. (Index Industrial Corp.)

For more data circle No. 68 on postcard, p. 139

Ring-Rolling Mill

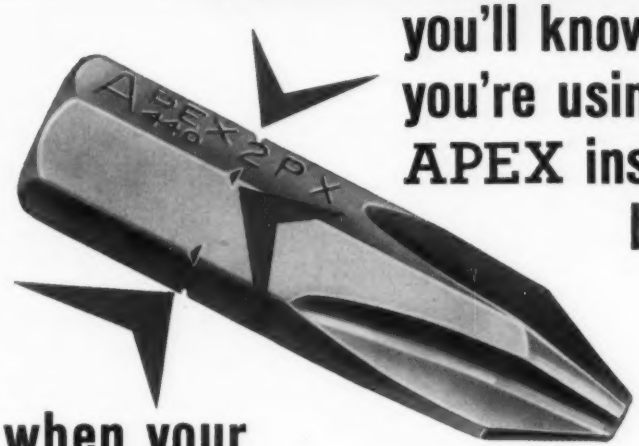
An improved ring-rolling mill produces precisely contoured rings. Heated steel rings with 3-sq in.



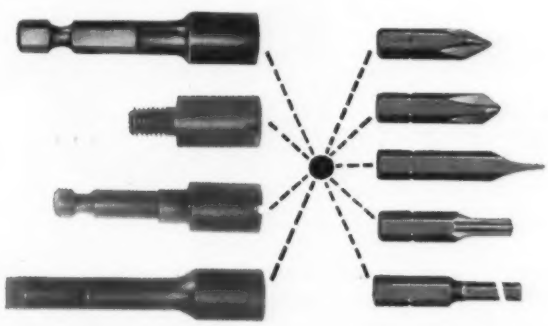
cross section and 15-in. ID are formed into rings with OD up to 50 in. It is capable of exerting pressure of 200,000 psi between

APEX the authority on fastening

you'll know you're using APEX insert bits when your fastening costs go down!



The notches in an Apex insert bit are more than mere identification. This groove—and only one is really necessary—is precisely positioned to accept the retaining ring in Apex bit holders. This original, patented Apex development prevents the bit from dropping out of the holder during the driving operation—just one more reason why your fastening costs are lower when you use Apex tools.



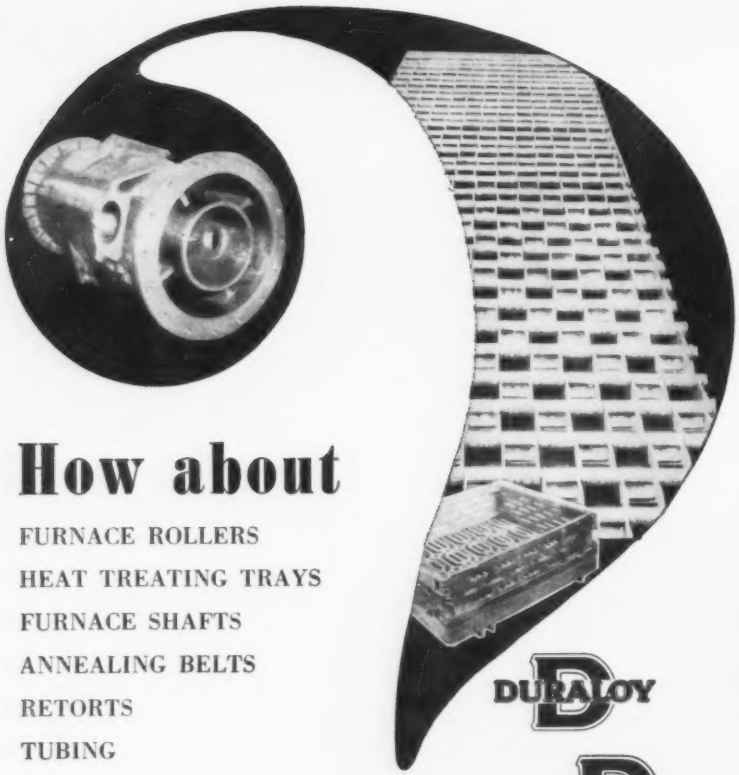
Apex bit holders, standard and magnetic, are available in shank types to fit all popular makes of air, electric and manual drivers. Each holder will accept a full range of insert bits to drive various types and sizes of screws. U.S. Patent No. 2,522,217; Canadian Patent No. 440,632. All part numbers original and copyrighted.

CATALOG 30-C Apex Screwdriving Tools, to drive Phillips, Frearson (Reed & Prince), Slotted, Clutch Head, Socket Head (Allen Type), Hex Head and special screws.

APEX FASTENING TOOLS

SCREWDRIVING • NUT RUNNING • SPECIAL

The APEX Machine & Tool Co. • 1029 So. Patterson Blvd. • Dayton 2, Ohio



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HEAT TREATING TRAYS
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Which are
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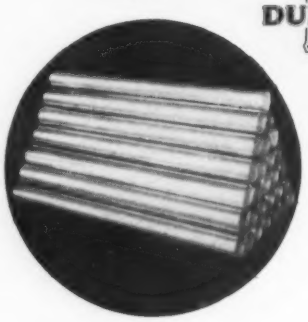


When ready to order, how about checking with us here at DURALOY? For more than thirty years we have specialized in high-alloy castings. In fact, we were among the first to produce static castings and the first to produce centrifugal castings. We are old hands at producing castings alloyed to fit each specific requirement and to finish them to any extent desired.

Melt, castings and finishing are carefully controlled and quality tested by our staff of metallurgists, chemists, X-ray and gamma-ray technicians. If you would like more preliminary information, send for Bulletin No. 3150-G.

The DURALOY Company
OFFICE AND PLANT: Scottdale, Pa.
EASTERN OFFICE: 12 East 41st Street, New York 17, N. Y.
ATLANTA OFFICE: 76—4th Street, N.W.
CHICAGO OFFICE: 332 South Michigan Avenue
DETROIT OFFICE: 23906 Woodward Avenue, Pleasant Ridge, Mich.

main and pressure roll. A ring-sensing device stops the rolling when the part reaches proper size. (Lombard Corp.)
For more data circle No. 69 on postcard, p. 139

ChipbreakerToolholder

A toolholder for throwaway carbide inserts features an indexing, fully adjustable solid carbide chipbreaker. It is easily adjustable through its entire range, until chips

of the desired length are obtained. The toolholder comes in five styles, right- and left-hand models, in three sizes, making a total of 30 negative-rake holders. (Metallurgical Products Dept., General Electric Co.)
For more data circle No. 70 on postcard, p. 139

Thickness Gage

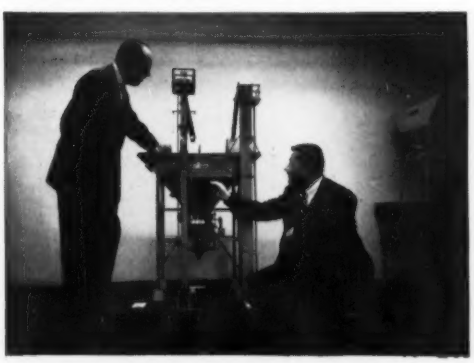
A portable ultrasonic thickness gage weighs only 10 lb. It can be carried into confined areas to measure thickness and inspect corro-

sion. Measurements are read directly from a meter. It can be used in a welding area to prevent welding of laminated plate or of plate containing excessive stringers. Using

Bill St. John (left) with Heltzel Chief Engineer, W. J. Kirchner, who said: "As a result of Bill's recommendation, we're using Jeffrey's combination chain. It's economical, yet gives the needed strength in our higher elevators."

"Jeffrey gives us the kind of service we want"

Heltzel buyer, John Holodnak (right): "It's strictly service as far as Jeffrey is concerned with us. Jeffrey gives us quotations in two days or less. They stock for us. Delivery is no problem."



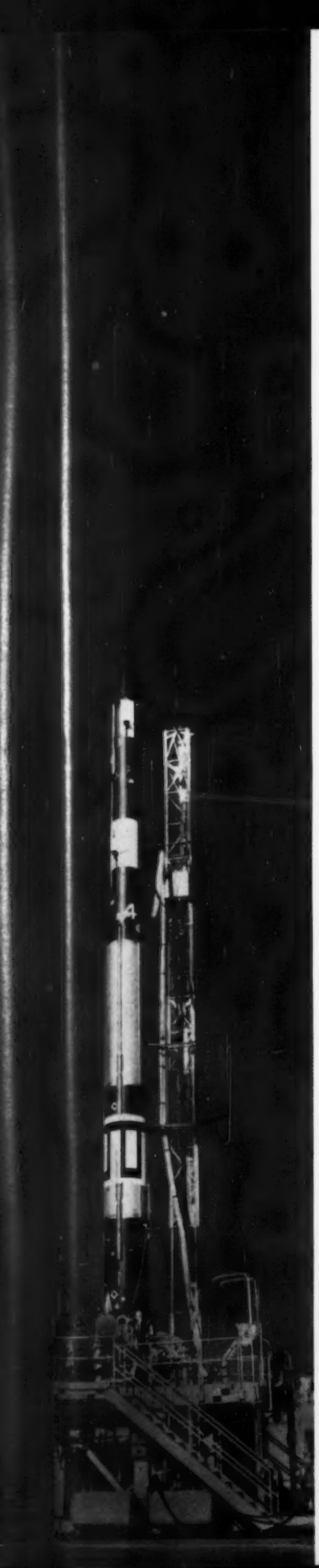
The Heltzel Steel Form & Iron Company, of Warren, Ohio, manufacturer of concrete batching plants, now looks to Jeffrey for power transmission components. Heltzel engineers and buyers agree that Jeffrey gives them the kind of service they want.

Commenting on Jeffrey service, Heltzel Chief Engineer, W. J. Kirchner stated, "Originally, Jeffrey's Director of Research came to Heltzel with Bill St. John (Jeffrey Northeast Ohio Sales Engineer). They sat down and discussed our needs – Bill knows what he's talking about. We understand each other. We have followed his recommendations in many instances."

Find out exactly how Jeffrey delivers the kind of service you ought to have. Arrange a meeting through the Jeffrey office nearest you, or contact: Manager, OEM Sales, The Jeffrey Manufacturing Company, 925 North Fourth Street, Columbus 16, Ohio.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT...TRANSMISSION MACHINERY...CONTRACT MANUFACTURING



Clete Smith, who helped develop a special solvent formulation for flushing rocket fuel tanks, says you'll like doing business with Columbia-Southern

Technical Service Engineer Clete Smith is one of many Columbia-Southern specialists who recently teamed up to formulate a new solvent for cleaning rocket fuel tanks and other parts without damage to the special metals and alloys used in rocket construction.

Aimed at solving a specific customer problem, this product is one example of Columbia-Southern's emphasis on keeping customers' needs foremost. Throughout the company, the aim is to develop products and methods and to work closely with customers to insure the most effective use of Columbia-Southern chemicals—and service.

For example, Technical Service recommendations on vapor degreasing with Columbia-Southern Trichlor recently saved a large chain-saw manufacturer $2,100 in tank maintenance costs in just 22 weeks. And an analysis of a window-frame vapor degreasing set-up, also using Trichlor, resulted in a 30% reduction in solvent consumption.

These are just some of the reasons why so many companies in every industry find it pleasant—and profitable—to do business with Columbia-Southern. They like the extra service Columbia-Southern routinely delivers along with its quality products.

Anhydrous Ammonia, Barium Chemicals, Benzene Hexachloride, Calcium Chloride, Calcium Hypochlorite (Pittchlor®, Pittabs®), Carbon Tetrachloride, Caustic Potash, Caustic Soda, Chlorine, Chlorinated Benzenes, Chloro IPC, Chrome Chemicals, Hydrogen Peroxide, Muriatic Acid, Pacific Crystals, Perchlorethylene, Rubber Pigments (Calcene®, Hi-Sil®, Silene®), Soda Ash, Sodium Bicarbonate, Sodium Sulfate, Titanium Tetrachloride, Trichlorethylene

columbia southern

CHEMICAL CORPORATION

A Subsidiary of Pittsburgh Plate Glass Company • One Gateway Center, Pittsburgh 22, Pa.

why make parts the slow, costly way?

COLD-HEAD THEM!

Steel

Tappet plunger, splined square-head shaft, collar for adjustment wedge, universal joint bearing cup, pipe plug, spark plug body.

Copper

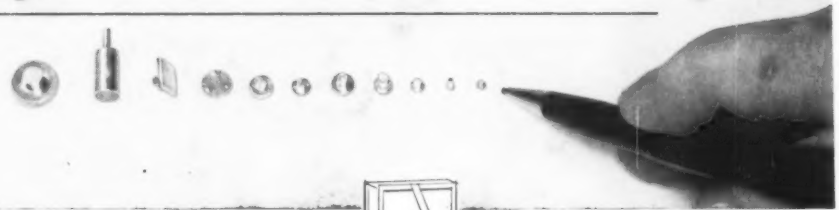
Ornamental stud, distributor cap center insert, commutator bar, wire clamp, solenoid contact, starter field terminal.

Aluminum

Hollow rivet, blind rivet, flanged collar, link, distributor cap outside insert.

Precious Metals

Electrical contact, transistor case, miscellaneous rivets and electrical contacts.



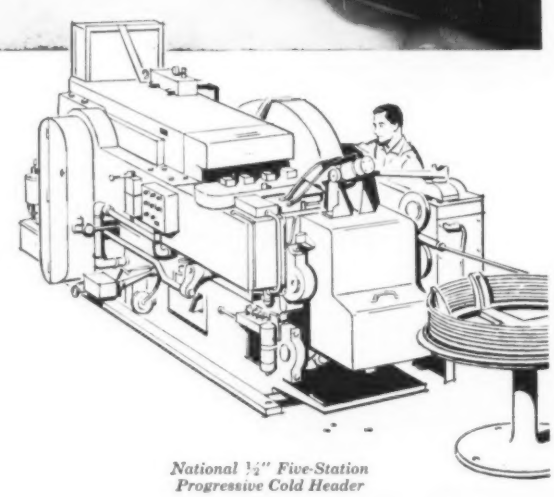
Of various metals, the parts identified above were developed for fast, accurate production on National Cold Headers.

Most of these important jobs are made without waste, ready for end use. All are cold-forged from coiled wire — start-to-finish in one compact Header — without any intermediate steps.

New technical break-throughs are making jobs like the above every day commercial realities. More workable wire, better lubricants, improved die materials and vast engineering experience are combining to adapt formerly difficult work to modern, profitable methods.

Whether you now have Headers or not, send us prints or samples of your jobs, or bring them to Tiffin where more of our people can help with *your* problem.

Perhaps up-to-date Cold Heading, a truly fast-growing process in metalworking, can pay off for you.



National ½" Five-Station Progressive Cold Header

Founded 1874—DESIGNERS and BUILDERS of MODERN FORGING MACHINES • MAXIPRESSES • REDUCEROLLS • COLD HEADERS BOLTMAKERS • NUT FORMERS • TAPPERS • NAILMAKERS CO-PIONEERS WITH INDUSTRY OF ADVANCED METALWORKING PRODUCTION METHODS

NATIONAL MACHINERY CO.

TIFFIN, OHIO, U. S. A.

HARTFORD DETROIT CHICAGO

the pulse-echo method of detecting changes in metal thickness, it can detect flaws and discontinuities, and can measure thickness where the surfaces are not parallel, or are pitted or rough. (Sperry Products, Inc.)

For more data circle No. 71 on postcard, p. 139

Percussion Screw Press

Weingarten Percussion Screw Presses (German) form all metals, hot or cold, and come in sizes from 80 to 3000 tons pressure. Stroke and pressure are variable over a wide range. The drive mechanism produces a sharp, elastic blow at the tool stage, and provides quick, automatic reversing of the ram by motor reversal. Accessories include ejectors, feed units, and a photo-electric safety device. (Cosa Corp.)

For more data circle No. 72 on postcard, p. 139

Jig-Boring Bars

A new line of carbide boring tools is specifically designed for high-surface-speed jig boring of holes from 1/16- to 1-in. diam. They are furnished separately, or

in adjustable holders with 0.001-in.-graduated scales. These holders are dynamically balanced so as to be efficient at high rpm. (Wetmore Tool & Engineering Co.)

For more data circle No. 73 on postcard, p. 139

75-hp, 36-speed Lathe

An extra-heavy-duty, high-speed engine lathe boasts 75 hp and 36 spindle speeds. A dial control automatically calculates cutting speeds. It is offered in three models with swings over the bed of 40½, 45½, and 49 in., and swings over the compound from 25½ to 36 in.

ACCO X-WELD ACID PICKLE CHAIN

A New Alloy Chain Specially Made to Withstand the Heat and Corrosion of Acid Pickling

This new chain resists the destructive effects of both heat and corrosion in normal sulphuric acid pickling operations. It can be used successfully in concentrations of Sulphuric Acid up to 20%, and at temperatures up to 200°F. Made in Acco's famed X-Weld design, this new chain has welds that are as strong or stronger than the chain itself.

Under comparison tests, Acco X-Weld Acid Pickle Chain has proved equal or superior to higher priced non-ferrous chain. In addition, the high alloy content makes it suitable for use in annealing furnaces at temperatures up to 1700°F. without scaling or without losing its acid-resistant properties. When subjected to elevated temperatures, full Working Load Limit of Acco Pickle Chain is restored when chain is returned to room temperature.

Acco X-Weld Pickle Chain is available now in five sizes (9/32" to 3/4") for assembly in Acco Registered Sling Chains. For information, write our York, Pa., office for **Bulletin DH-169.**

ACCO Registered
SLING CHAINS

American Chain Division · American Chain & Cable Company, Inc.
Bridgeport, Conn. • Factories: *York and *Braddock, Pa.
Sales Offices: *Atlanta, Boston, *Chicago, *Denver, Detroit, *Houston, *Los Angeles, New York, Philadelphia, Pittsburgh, *Portland, Ore., *San Francisco
*Indicates Warehouse Stocks

ACCO

Job report courtesy of
Electric Steel Foundry Company, Portland, Oregon

When nuclear applications call for stainless welds of highest quality

WELD WITH ARCOS

STAINLESS ELECTRODES

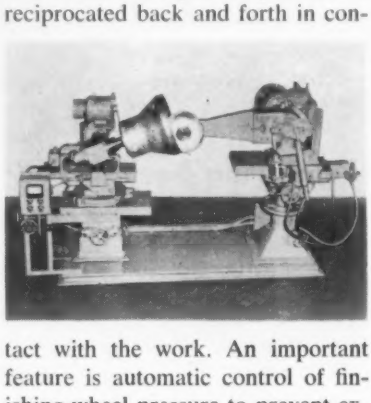
This is part of a 3900 lb. stainless pump-volute casting for a submarine nuclear power plant. In the photo, a skirt is being welded to the casting using 5/32" dia. Arcos Chromend K Electrodes. To minimize stresses, a step-back and skip procedure was used. These welds conformed to Class I Navy radiographic standards—an indication of the dependability of standard Arcos electrodes for your stainless welding needs. ARCOS CORPORATION, 1500 South 50th St., Philadelphia 43, Pa.

There are 60 thread leads and feeds. Featured are rapid traverse, fully enclosed worm drive, and positive-feed, non-stick clutches. Optional accessories include fluid tracer control. (Sidney Machine Tool Co.)

For more data circle No. 74 on postcard, p. 139

Reflector Polisher

An automatic polishing machine is specially designed for finishing a wide variety of shapes and sizes of reflectors and bowl-shaped metal parts in a fully automatic cycle. All metals, including stainless steel and aluminum-clad materials, can be effectively finished. The part is rotated while the polishing wheel is reciprocated back and forth in con-



tact with the work. An important feature is automatic control of finishing-wheel pressure to prevent excessive pressures when contact surfaces change from large to small radii, as in oval reflectors. Also, automatic reversal of wheel rotation during finishing enables both cutting and coloring operations to be performed in one work cycle. (Acme Mfg. Co.)

For more data circle No. 75 on postcard, p. 139

Grinding Disks, Belts

A new line of resin-bonded aluminum-oxide abrasive, available on fiber disks and cloth belts, in tests has outperformed existing materials almost without exception. It has proved particularly effective on stainless steel and nonferrous alloys where increased abrasive life is accompanied by a marked freedom from heating and resultant discoloration of the metal. Extreme sharp-

ness and fast cutting are sustained even in rigorous service. Disks come from 150 through 24 grit, belts from 180 through 24. (Behr-Manning Co.)

For more data circle No. 76 on postcard, p. 139

Plug-In Bus Duct

A new type bus duct for distributing electricity in plants and buildings is exceptionally flexible, easy and safe to install, and features plug-in power takeoffs at any place along the line without disconnecting the main power line. It comes in 10-ft lengths, and elbow units and end pieces are available. It has a very low voltage drop, and can use aluminum or copper. It comes in ratings from 225 to 1000 amp, and up to 600 v. (I-T-E Circuit Breaker Co.)

For more data circle No. 77 on postcard, p. 139

Aircraft Drills

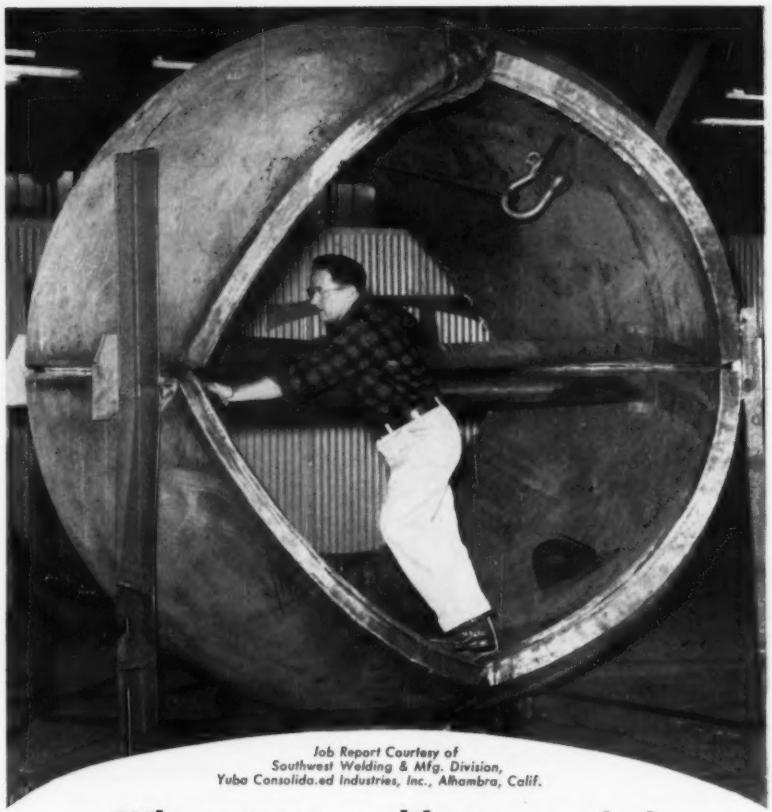
Designed to work high-strength aircraft and missile materials, new drills have short, sturdy flutes for rigidity and a special split point for maximum penetration rate. They are made of 8-pct cobalt super-

high-speed steel. They are available in a complete aircraft range of sizes. They maintain sharp cutting edges under high-temperature operating conditions. (Chicago-Latrobe)

For more data circle No. 78 on postcard, p. 139

Welding Flux Grinder

A grinder for reclaiming submerged melt welding flux will pay for itself after 12,000 lb of flux has been reclaimed. It processes over 1500 lb per hour, with low flux loss



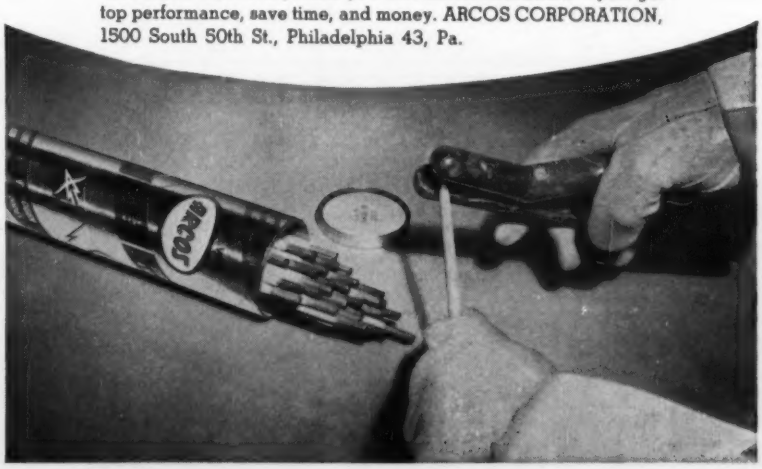
Job Report Courtesy of Southwest Welding & Mfg. Division, Yuba Consolidated Industries, Inc., Alhambra, Calif.

When strong welds are needed to resist impact at minus 320°F

WELD WITH ARCOS

STAINLESS ELECTRODES

This six-section spherical liquid oxygen container is made of Type 321 stainless steel. Walls 4½" thick were required to withstand 3000 psi pressure. To assure crack-free welds to meet ASME impact properties at −320°F, it was welded with Arcos Chromend 19/9Cb-LC electrodes with controlled ferrite. The first time—and every time you use Arcos electrodes—you get top performance, save time, and money. ARCOS CORPORATION, 1500 South 50th St., Philadelphia 43, Pa.

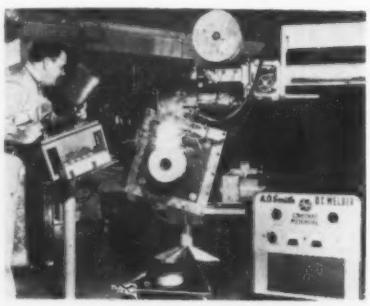


and minimum dust. It is ruggedly constructed for long life. (L & B Welding Equipment, Inc.)

For more data circle No. 79 on postcard, p. 139

Automatic CO_2 Welder

A new CO_2 automatic welder is designed for high-speed production. It provides high-quality weld metal, high deposition rates, deep penetration, low-hydrogen weld metal, visible arc, and no slag removal. It uses small-diameter wires specifically designed for welding mild and medium carbon steels. It can be used for single and multiple-pass butt welds,



flat and horizontal lap welds, positioned and horizontal fillet welds, and circumferential butt and fillet welds. (A. O. Smith Corp.)

For more data circle No. 80 on postcard, p. 139

Infrared Space Heaters

New portable gas-fired infrared radiant heaters provide instant infrared heat that warms the man and the job but not the air. Using polished reflectors, they can be concentrated on specific areas, and can keep workmen, tools, and material comfortably warm even when the temperature is very low. They can also be used for spot heating, thawing, curing, drying, or baking. (Perfection Industries)

For more data circle No. 81 on postcard, p. 139

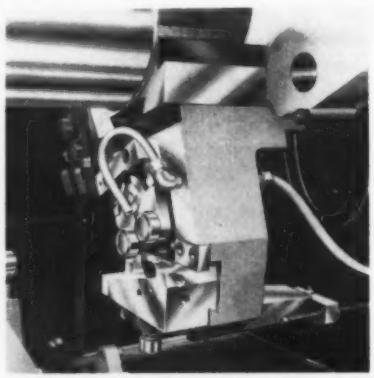
Air Compressor

A new high-efficiency multi-stage centrifugal air compressor is designed to furnish 100-psi air for oxygen plants, centralized air systems, and other industrial air applications. High efficiency results from a newly designed intercooler system and carefully engineered volute and impeller designs. Six case sizes offer horsepower from 1000 to 8000 and capacities from 5000 to 38,000 cfm. (Clark Bros. Co.)

For more data circle No. 82 on postcard, p. 139

Box Tool Retracts

Tool withdrawal marks are eliminated and cutter life is prolonged with a new bar turner incorporating a retractable cutter designed for the same company's 2AB single-



spindle bar automatic. The tool clamps directly in the turret dovetail, and the cutter retracts and resets automatically. (The Warner & Swasey Co.)

For more data circle No. 83 on postcard, p. 139

Planer Milling Head

A milling head is designed to permit conversion of planers into planer mills equal in value and capacity to expensive new machines,

WARD STEEL CO.

PROMPT WAREHOUSE SERVICE ONLY

Most Complete Stock in America of

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INITIAL PINCH TYPE PLATE BENDING ROLL

Capacity to 6 inch plate cold

The LARGEST ever built

Our Line

Light and heavy machinery for all classes of sheet metal, plate and structural work

BERTSCH & COMPANY, CAMBRIDGE CITY • INDIANA

at about one-tenth the cost. Large production increases in processing heavy jobs have been achieved in this manner. Built to handle carbide tooling, the two-speed head rates 30 hp at 900 rpm and 15 hp at 450 rpm, and is capable of milling all grades of steel and cast iron. (Veet Industries)

For more data circle No. 84 on postcard, p. 139

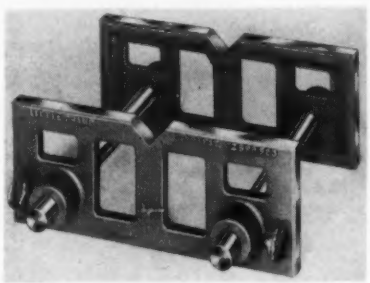
Plastic Drums

Molded polyethylene drums in various sizes are extremely resistant to corrosion. They are thus useful as dipping tanks for electroplating. They can also be used to handle and store acids. (Redmanson Corp.)

For more data circle No. 85 on postcard, p. 139

Adjustable Parallels

Adjustable parallels come in sizes of 3 x 6 and 4 x 10 in., with respective spreader-bar lengths of 6 and 10 in. They can accommodate regu-



lar or irregular pieces, flat or round stock. They are top and bottom ground to insure parallelism. (Threadwell Tap & Die Co.)

For more data circle No. 86 on postcard, p. 139

N-C for Rotary Millers

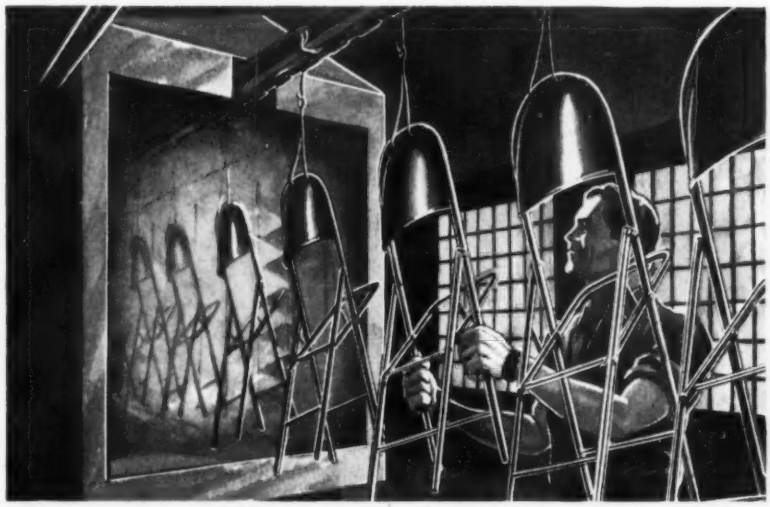
A numerical control system for rotary profile milling machines provides a versatile method of machining any number of different part shapes with only one machine tool. A 2-axis system, it can help reduce manufacturing and tooling costs and lead time on complex parts. Sensitive, it provides 0.0002-in. command pulse to the linear axis and 0.002-degree command pulses to the rotary axis. It has high tape-reading speed. (Bendix Aviation Corp.)

For more data circle No. 87 on postcard, p. 139

For the best in pressure spray washing

ask Oakite

OVER 50 YEARS CLEANING EXPERIENCE • OVER 250 SERVICE MEN • OVER 160 MATERIALS



Even the highest spray washer pressures won't foam Oakite 161 alkaline detergent

Turn on the highest pressures to speed cleaning—you won't get any foaming problems with Oakite 161. Nor any etching problems, either. This alkaline detergent is specially designed for *safe* pressure spray washing of any metal—aluminum, white metals, brass, steel.

And it does a thorough job. Oakite 161 blasts off identification inks, grease, oil and shop soils . . . gives a completely clean surface for inspection or final finishing. Costly? Not at all. Extra long solution life and low concentrations assure low per-unit production costs.

One of a complete line of Oakite products for spray washers, Oakite 161 is complemented by heavy-duty solvent cleaners, moderate to light-duty alkaline materials. Ask the Oakite man to help you make the choice that's right for your washer . . . right for your products. Or send for Bulletin F-9773. Oakite Products, Inc., 24 Rector Street, New York 6, N. Y..

it PAYS to ask Oakite

OAKITE

50 1909-1959 SCIENCE

years' leadership in industrial cleaning

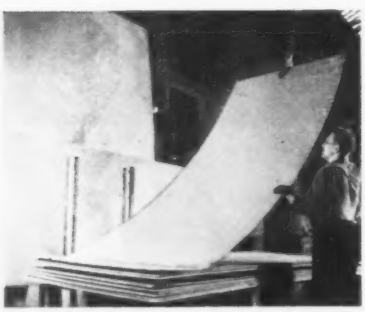
STAINLESS DIRECTORY

Buyers Guide to Ryerson Stainless Stocks & Services

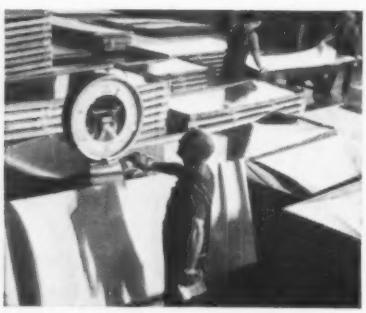
Here's a quick guide to the nation's largest stocks of stainless steel. This wide selection assures you of getting the best stainless for every application.

Extra care in storage, handling and shipping guards the high quality of Ryerson stainless stocks. For example, shear clamps are padded to protect the fine finish and flatness of sheets. And in addition, the help of experienced stainless specialists is yours when you call Ryerson on problems of application or fabrication.

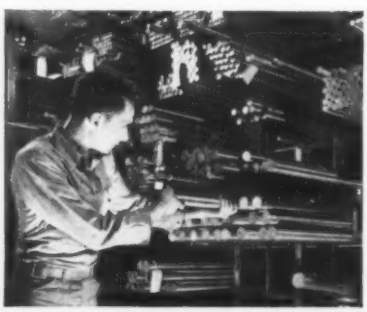
See your Ryerson catalog for a complete listing of stainless stocks and call your nearby Ryerson plant for immediate shipment.



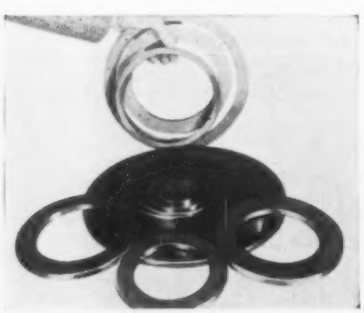
PLATES—Available in 9 analyses including plates to Atomic Energy Commission requirements and to ASTM specifications for code work. Also low carbon types for easy welding.



SHEETS—11 analyses of Allegheny stainless sheets in stock including nickel and straight chrome types. Also extra wide sheets to reduce welding costs, expanded and perforated sheets.



BARS AND ANGLES—Rounds, squares, flat's, hex's and angles in 8 types including free-machining bars with both analysis and mechanical properties controlled.



RINGS AND DISCS—Machine cut to your order. This service assures size accuracy, smooth edges, flatness and unaffected corrosion resistance in a lower-cost, ready-to-use product.

HEADS—A.S.M.E. flanged and dished heads in types 304, 304L, 316 and 316L are on hand in large quantities, and in a wide range of gauges and sizes.

PIPE AND TUBING—Light wall, standard and extra heavy pipe, ornamental and regular stainless tubing. Also screwed type and welding fittings and Cooper stainless valves.

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Increased Value in Buying Metals
Ask about this Ryerson Plan for 1959

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The Iron Age Summary

New Talks Make Little Progress

Secret talks did clear the air somewhat, but union and companies are still far apart on key issues.

Controversial 2-B clause may go to arbitration, but under language acceptable to union.

▪ Steel negotiations have been stepped up in the form of secret meetings between top negotiators.

Pressure on both the union and the companies have resulted in the renewed negotiations. This is in advance of scheduling meetings by Federal mediators.

Pressures Mount — Pressure on the Steelworkers is to avoid a second walkout after the Taft-Hartley injunction runs out. Pressure on the companies is in the threat of Congressional action to force compulsory arbitration if the strike continues into the next session of Congress.

But the recent meetings did not bring the two sides close enough together to cause a surge of optimism. They did clear some of the air between David J. McDonald, Steelworkers president, and R. Conrad Cooper, chief industry negotiator.

Possible Package—If a "voluntary" settlement is reached, it will be classed as a non-inflationary package. It will probably be a three-year contract and may be sweetened slightly from the last offer made a few weeks ago of 10¢ an hour wage cost.

The best guess on the critical 2-B clause is that if it goes to arbitration, the language must be a two-way street. This is to counter the union claim that it is not treated equitably in the companies' first arbitration proposal.

Encirclement Tactics — Meanwhile, Mr. McDonald and the Steelworkers union are launching a plan of massive encirclement. The intent is to reach settlements with the aluminum industry, the copper industry, and the canmaking companies. All of them are now negotiating with the Steelworkers union.

This, Mr. McDonald hopes, would put irresistible pressure on steel, as the one remaining holdout, and force a settlement.

Market Facts—On the steel market front, the startup under the T-H injunction is going ahead faster than even the optimists predicted. This is because of three factors: Advance planning by the industry before and during the strike; less damage to steelmaking facilities than feared; and better than hoped for cooperation by steelworkers.

But while mills rush ingot-making operations, it will still be weeks before normal tonnages of finished steel products are shipped. The first shipments of products stored or in process at the mills raised some false hopes. Mills are discouraging premature joy.

The use of conversion ingots in some mills is also a big factor in early shipments. These are principally earmarked for the auto and appliance industries who arranged the deals.

Bottlenecks now are in finishing facilities and rail car shortages.

Steel Output, Operating Rates

Production (Net tons, 000 omitted)	This Week 2,246	Last Week 1,273	Month Ago 368	Year Ago 2,011
Ingot Index (1947-1949=100)	139.2	79.3	22.9	125.2
Operating Rates				
Chicago	74.0	37.0*	5.0	87.0
Pittsburgh	76.0	35.5*	4.0	69.0
Philadelphia	92.0	40.0*	12.0	73.0
Valley	74.0	34.0*	10.0	55.5
West	71.0	43.0*	0.0	82.0
Cleveland	78.0	41.0*	0.0	70.0
Detroit	77.0	46.0*	24.0	95.0
Buffalo	100.0	78.0	0.0	78.0
South Ohio River	88.0	80.0*	70.0	81.0
South	81.0	45.0*	12.5	58.0
Upper Ohio River	87.5	66.0*	58.0	88.0
St. Louis	90.0	94.0*	102.0	98.0
Aggregate	79.0	45.0	13.0	74.5

*Revised

Prices At a Glance

(Cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.41	$66.41	$66.41	$66.41
Scrap No. 1 hvy (Gross ton)	$46.17	$46.17	$45.17	$41.17
No. 2 bundles	$31.83	$31.50	$30.50	$29.33
Nonferrous				
Aluminum ingot	26.80	26.80	26.80	26.80
Copper, electrolytic	30-33	30-33	30-31.50	29.00
Lead, St. Louis	12.80	12.80	12.80	12.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	101.00	101.375	102.125	99.25
Zinc, E. St. Louis	12.50	12.50	12.00	11.50

Industrial Trucks Keep Rolling

Industrial truckmakers, for the most part, have enough steel to continue production.

Deliveries will probably stay good, and prices will rise only if steel costs rise.

▪ Industrial truck business is up sharply over 1958, but that doesn't mean the truck makers haven't their share of headaches. Like most metalworking industries, the problem is steel.

One major maker, with a very broad line of equipment reports he gambled and laid in a heavy supply of steel early in the year. He had just about enough to last through the record shutdown. But the problem turned out to be suppliers.

Reverse Play — For example, gearmakers supplying the company reported weeks ago that they were just about out of steel. This manufacturer had to supply his supplier to keep his lines going.

Another large manufacturer of lift trucks is just going to make it. He rummaged and scrambled, lived day-to-day, and in many cases paid a premium, but was for the most part able to come up with enough steel.

Suppliers were a problem here also. But without the unusually large steel stocks to fall back on, remedial action was taken early in the game.

Hundred Calls — "I telephoned about 100 of these fellows early last month," reported a spokesman for this maker. "I discovered about three soft spots so we moved right away to clear them up."

Delivery schedules right now are just so-so. One maker calls them bad, another calls them average. But both agree it would take from four to six weeks for delivery of a standard model lift truck.

Tight Line—One major problem is flexibility. Makers just don't have the steel for any last minute, crash projects. And they don't dare make changes once a job starts production with steel allotted to it. This is going to result in badly balanced finished goods inventories.

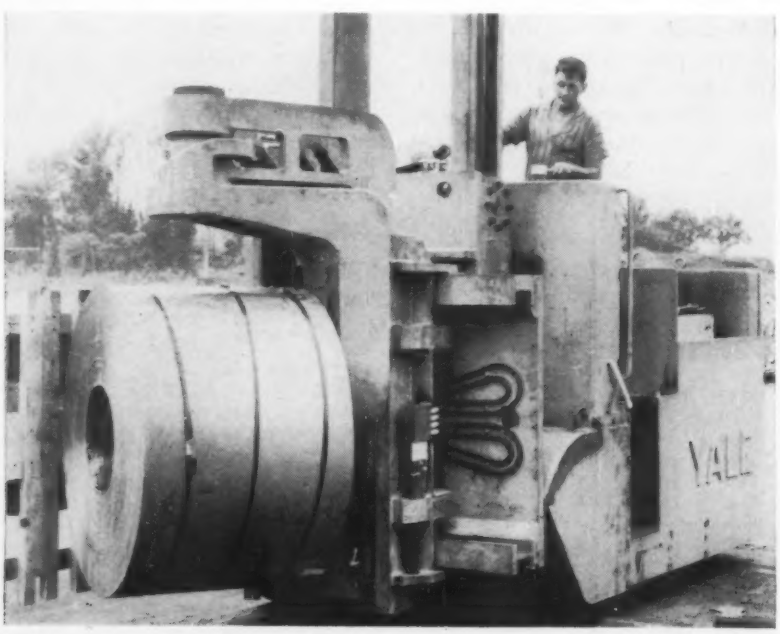
Railroad Pressure—There's liable to be another problem in delivery schedules. Railroad labor contracts will come to a head in January. If there's a strike, makers say they'll go all out to make deliveries by truck as much as possible. And they'll advise suppliers to ship by truck. But the schedules are bound to be stretched out.

Despite business levels running anywhere from 15 to 40 pct ahead of last year, depending on the company, makers say there are a lot of customers staying out of the market because their operations have been crippled for lack of steel. If the steel strike is settled without another long shutdown, the rush will be on for the second quarter.

Prices Look Good—Lift truck makers say they'll probably be able to handle the added customers without too much of a stretchout in delivery dates, but they sound like they've got their fingers crossed.

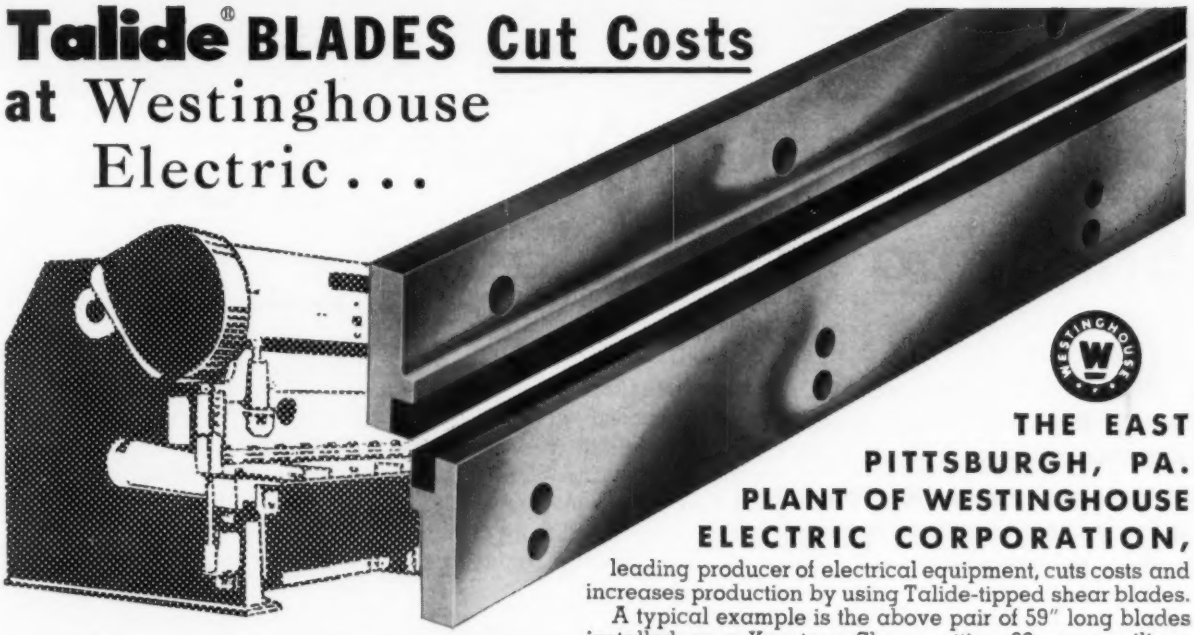
The price picture looks firm. Traditionally, industrial truck prices follow basic steel moves closely. Business has firmed the market. But it's a very competitive field.

If steelmakers bump prices only slightly, some lift truck makers suggest they may be able to absorb this. If there's no steel price hike, there'll be no lift truck price hike.



SPOTTY: While lift truckmakers have some steel, they haven't enough to be flexible. Some special purpose trucks, like this Yale & Towne coiled tinplate upender and palletizer, are on long delivery schedules.

Talide® BLADES Cut Costs at Westinghouse Electric . . .



THE EAST PITTSBURGH, PA. PLANT OF WESTINGHOUSE ELECTRIC CORPORATION,

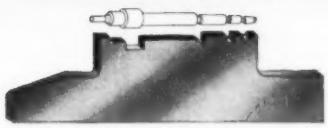
leading producer of electrical equipment, cuts costs and increases production by using Talide-tipped shear blades.

A typical example is the above pair of 59″ long blades installed on a Keystone Shear cutting 29 gauge silicon steel up to 36″ wide. Cutting continuously for periods up to 8 months without a regrind, approximately 5,631,000 strokes are performed at an average speed of 30 strokes per minute. 3,660 tons of metal are cut per regrind at a savings of over $2,000 alone in grinding and set-up time.

During this same period it was previously necessary to grind high-carbon, high-chrome blades 24 times — and make frequent replacement. Talide blades normally stay on the job for several years giving high-speed, continuous, burr-free production.

Talide blades are available in lengths up to 120″ tipped with a **one-piece** carbide wear strip. There are no section or seam marks to score or scratch the metal being sheared or centerless ground. Users prefer blades of this superior construction.

CENTERLESS BLADES



LARGE ELECTRIC MOTOR PLANT

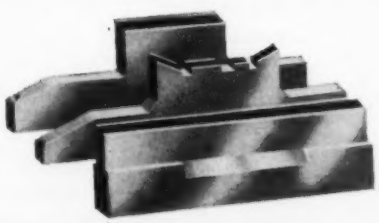
Part..... Stainless steel rotor shaft for electric motor.

Operation... Grind 7 diameters simultaneously.

Machine.... No. 12 Landis Centerless Grinder.

Blade..... Special multiple step Talide-tipped work support blade No. C-4884.

Results..... Talide-tipped blade in continuous production for 91 days (2 turns per day) compared to best previous production run of 3 days with hard alloy steel blade.



Over 50 sizes and styles of standard Talide-tipped blades carried in stock for Landis, Cincinnati and Van Norman Centerless Grinders. Special blades made promptly to order.

TALIDE ROTARY KNIVES GIVE PHENOMENAL RUN OF 90-1 . . .

A leading strip steel producer of razor blade, high-carbon, spring and stainless steel reports over 1200 coils were gang slitted with Talide knives, compared to 15 coils with steel knives. More tonnage was produced in one regrind of the Talide knives than over the entire life of a set of steel knives. Burr-free, clean-cut edges produced with scrap rate practically eliminated.

EXCLUSIVE RETIPPING SERVICE

Because of its exclusive hot press method, Metal Carbides is able to rework worn, chipped-out or broken areas of carbide-tipped blades back to original size and dimension with all breaks and defects eliminated.

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METAL CARBIDES CORPORATION
Youngstown 12, Ohio

Doubts Remain About Shipping Schedules

Even with the mills making steel, there's confusion about shipments to users.

Producers expect to have better picture on delivery prospects in a few weeks.

▪ Confusion over steel deliveries still grips the market.

Both producers and users lack an accurate basis for determining how fast shipments will move out in the weeks ahead. Typical comment of one mill sales manager: "We'll review all the orders on the books in about a month. By that time we should be able to give realistic delivery dates."

A bar mill spokesman says operations will continue on and off for the next few weeks. "There are still a lot of unknowns," says another sales official. "If steel doesn't come through on schedule we could wind up shutting down finishing lines."

No Ready Answer—There's no clear answer yet on when heavy tonnages will begin reaching customers. Shipping schedules remain fluid at many mills. Most producers are trying to clean up orders placed for delivery in July and August. After that, they will decide what can be done about remaining backlogs.

Best estimate now is that many products will remain on a restricted basis through the first half of 1960. Most critical will be sheet, plate, bar, and shapes.

More Waiting—In spite of the fast startup, it will be weeks before the big steel users get a balanced flow of sheets and bars.

The effects will be tough all around. Automakers have already started to put on the pressure for more than their usual share of shipments. This indicates the competition ahead for users.

Sheet and Strip—Mills hope to have enough ingot tonnage so there will be no cutbacks in finishing operations. Some have bought ingots to help speed output. Conversion tonnage purchased by automakers is being fed into other mills.

Mills will work off summer tonnages before they think about current orders. These may not go out before January or February.

Shortages in cold-rolled sheet are expected all through the first half of 1960. Hot-rolled sheet and strip will also be in tight supply.

Shapes and Plates—Plate mills now starting up have order backlogs of three or more months. Many mills are not accepting any new orders until shipping schedules can be worked out. An **Eastern** structural mill says orders for standard shapes extend out about four months, wide flange beam orders about five months.

Plate and structural mills are concerned about the effect of military orders on deliveries. They must ship all defense-rated tonnage due this quarter by January. They have some rated orders held over from the strike. And there are super priority orders which must be shipped before everything else.

Bar—Some mills say it will take them until mid-January to clean up orders booked before the strike. With new orders coming in freely, there's a prospect of full rolling schedules through the first half of next year. Some producers speeded startup of rolling by using stocks of billets carried over from July.

Users say foreign supplies of bar and rod are just about cleaned out. Buyers of large rounds feel that grade may be very tight in the first quarter. Large rounds of forging quality will also be scarce.

Pipe and Tubing—This is how John Timberlake, vice president, sales, Jones & Laughlin Steel Corp. sums up the outlook for oil country seamless: "At the end of 30 days our ingot rate will be 85 to 90 pct. It will be 60 days before seamless users can expect a regular, organized schedule of shipments. Once we get rollings, the steel industry will produce oil country pipe at a much higher rate than buyers will use it in 1960."

But oil men believe they may run into a pipe supply pinch late in the first quarter. Orders placed now won't be delivered until March or April. Because of the condition of the petroleum industry, oil men are not too worried about the prospect of cutbacks.

Service Centers — With inventories depleted, warehouses expect a slow month during November. Some hope, with renewed supplies coming from mills, to hold their own or pick up next month. Service centers are concerned about sheet shortages. With the product tight, rebuilding of inventories will be difficult. Prospects are better for increasing stocks of plate, structural, and bar.

PURCHASING AGENT'S CHECKLIST

Smooth flow of materials helped get steelmaking off to fast start. P. 77

Foreign toolmakers put on the hard sell to capture more American markets. P. 103

How value analysis promotes product appearance. P. 117

COMPARISON OF PRICES

(Effective Nov. 17, 1959)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Nov. 17 1959	Nov. 10 1959	Oct. 20 1959	Nov. 18 1958
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	13.55	13.55	13.55	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchant bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Nov. 17 1959	Nov. 10 1959	Oct. 20 1959	Nov. 18 1958
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.57
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	12.25	12.25	12.25	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$47.50	$47.50	$46.50	$44.50
No. 1 steel, Phila. area	46.50	46.50	44.50	36.50
No. 1 steel, Chicago	44.50	44.50	44.50	42.50
No. 1 bundles, Detroit	44.50*	42.50	39.50	36.50
Low phos., Youngstown	51.50	51.50	47.50	46.50
No. 1 mach'y cast, Pittsburgh	55.50	55.50	54.50	51.50
No. 1 mach'y cast, Phila.	54.50*	53.50	53.50	49.50
No. 1 mach'y cast, Chicago	64.50	64.50	64.50	53.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$46.17	$46.17	$45.17	$41.17
No. 2 bundles	31.83*	31.50	30.50	29.33
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.50-15.50	$14.50-15.50	$14.50-15.50	14.50
Foundry coke, prompt	18.50	18.50	18.50	18-18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	30-33	30-33	30-31.50	29.00
Copper, Lake, Conn.	33.00	33.00	31.50	29.00
Tin, Straits, N. Y.	101.00†	101.375	102.125	99.25
Zinc, East St. Louis	12.50	12.50	12.00	11.50
Lead, St. Louis	12.80	12.80	12.80	12.80
Aluminum, virgin ingot	26.80	26.80	26.80	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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Trade Awaits First Major Buys

Is a thread of fear starting to appear among the big holders of scrap?

Delay of mills to buy while still moving purchased scrap has some of the trade worried.

▪ The trade was a little less optimistic this week as mills failed to come into the market as expected.

Small purchases tended to confirm price levels, but the big buys did not appear. The big question: Are mills loaded with inventory and scrap bought during the strike, or are holding off in hopes of lower prices?

Some small lists, principally railroad, are showing strength. But all eyes will be on the choice automotive lists closing next week. Export continues strong and holds up East Coast prices.

Buys on the West Coast by mills pushed prices up significantly.

Pittsburgh—The first week of the steel startup saw no major buys. A small tonnage of No. 2 bundles was sold at the going market level. The mills are pushing for shipment of old orders. But the general buying wave has not broken. Some scrap men felt the lack of action had created an easier, or at least a more uncertain, mood. However, a late railroad list showed prices of most grades up from last month. And mill operating rates moved up rapidly in the startup week.

Chicago—After a week of rumors the market emerged strong, but without major changes. Reports of a $46 sale of No. 1 dealer heavy melting could not be confirmed. Small purchases by district mills brought in some scrap at existing prices. Offers at lower prices failed to affect the general market strength. With scrap collections still falling in some yards, dealers are reluctant to sell. Scrap continues to move to out-of-area mills.

Philadelphia—Dealers and brokers are still waiting for the mill buying wave expected when operations resumed. As yet, only small tonnages are moving, some on old orders. However, a strong export market and a representation buy of No. 1 busheling support the market at present levels. Three boats are loading for export. Current sales pushed No. 1 busheling up $2 to $48-$49. Low phos rose $3. Other grades showing increases were railroad specialties, cast iron car wheels, and No. 1 machinery cast.

New York—Steelmaking grades have climbed $2 per ton as mills step up steelmaking operations. No. 1 heavy melting now carries a top price of $40. Blast furnace grades are also up $1 per ton from new orders, with shoveling turning at a top of $17.

Detroit—There is no consumer market this week. Mills aren't seeking scrap. They're using scrap they had stored on docks and in brokers' yards. This, plus extension of the Great Lakes iron ore shipping season past mid-December, is creating worries. First indication of the market's strength or weakness is looked for next week when industrial lists close.

Cleveland—Market is still concentrating on shipping laid-down scrap. Expected new orders have not materialized. No. 1 heavy melting is up $1 on appraisal sympathetically with electric furnace grades which are in good demand and scarce. Good foundry scrap is still hard to come by and most consumers must reach for it.

St. Louis — The market drifted along at a steady pace here. Since mills have been working throughout the strike, back-to-work order had no effect. There is ample scrap in the area and everyone seems satisfied with prices at current levels.

Cincinnati—The tone of the market has weakened somewhat when new orders failed to come out with resumption of steel production.

Birmingham—Despite reopening of the steel mills, the scrap market looks weaker. Some major consumers released shipments on purchases made during the strike, but bought only nominal amounts at prices under those paid by speculative brokers. Other consumers also refused to raise prices. Dealers were disappointed, but accepted some large tonnage orders. Electric furnace scrap was inactive. Cast prices were firm on small orders.

Buffalo—The price of No. 2 heavy melting is up $3 on the basis of a small sale made here. Only other activity was a sale of No. 2 bundles at quoted prices. Dealers are awaiting further orders from mills. Scrap has started to flow into this port from lake ships.

Boston — The reopening of the steel mills hasn't produced a thing. The market is firm, but business hasn't increased.

West Coast — Mill activity in San Francisco pushed No. 1 heavy melting up $4 per ton. In Los Angeles, top steelmaking grades firmed at $1 higher. Seattle mills have not yet come into the market.

Houston — The district mill did not enter the market although it went back into production. A spokesman said it might not come in until late December. It is still tapping its large inventory.

SCRAP PRICES *(Effective Nov. 17, 1959)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$47.00 to $48.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 dealer bundles	48.00 to 49.00
No. 1 factory bundles	53.00 to 54.00
No. 2 bundles	33.00 to 34.00
No. 1 busheling	47.00 to 48.00
Machine shop turn.	24.00 to 25.00
Shoveling turnings	31.00 to 32.00
Cast iron borings	30.00 to 31.00
Low phos. punch'gs plate	55.00 to 56.00
Heavy turnings	40.00 to 41.00
No. 1 RR hvy. melting	51.00 to 52.00
Scrap rails, random lgth.	61.00 to 62.00
Rails 2 ft and under	66.00 to 67.00
RR specialties	60.00 to 61.00
No. 1 machinery cast.	55.00 to 56.00
Cupola cast	51.00 to 52.00
Heavy breakable cast.	49.00 to 50.00
Stainless	
18-8 bundles and solids	235.00 to 240.00
18-8 turnings	115.00 to 120.00
430 bundles and solids	130.00 to 135.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	41.00 to 42.00
No. 1 dealer bundles	44.00 to 45.00
No. 1 factory bundles	50.00 to 51.00
No. 2 bundles	31.00 to 32.00
No. 1 busheling	44.00 to 45.00
Machine shop turn.	26.00 to 27.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	28.00 to 29.00
Cast iron borings	28.00 to 29.00
Low phos. forge crops	58.00 to 59.00
Low phos. punch'gs plate, ½ in. and heavier	55.00 to 56.00
Low phos. 2 ft and under	53.00 to 54.00
No. 1 RR hvy. melting	50.00 to 51.00
Scrap rails, random lgth.	59.00 to 60.00
Rerolling rails	67.00 to 68.00
Rails 2 ft and under	64.00 to 65.00
Angles and splice bars	58.00 to 59.00
RR steel car axles	61.00 to 62.00
RR couplers and knuckles	55.00 to 56.00
No. 1 machinery cast.	64.00 to 65.00
Cupola cast	57.00 to 58.00
Cast iron wheels	51.00 to 52.00
Malleable	65.00 to 66.00
Stove plate	53.00 to 54.00
Steel car wheels	56.00 to 57.00
Stainless	
18-8 bundles and solids	220.00 to 225.00
18-8 turnings	120.00 to 125.00
430 bundles and solids	120.00 to 125.00
430 turnings	60.00 to 65.00

Philadelphia Area

No. 1 hvy. melting	$46.00 to $47.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 dealer bundles	48.00 to 49.00
No. 2 bundles	30.00 to 31.00
No. 1 busheling	48.00 to 49.00
Machine shop turn.	24.00 to 25.00
Mixed bor. short turn.	23.00 to 24.00
Cast iron borings	22.00 to 23.00
Shoveling turnings	27.00 to 28.00
Clean cast. chem. borings	30.00 to 31.00
Low phos. 5 ft and under	50.00 to 51.00
Low phos. 2 ft punch'gs	52.00 to 53.00
Elec. furnace bundles	49.00 to 50.00
Heavy turnings	34.00 to 35.00
RR specialties	50.00 to 51.00
Rails 18 in. and under	67.00 to 68.00
Cupola cast	46.00 to 47.00
Heavy breakable cast.	47.00 to 48.00
Cast iron car wheels	50.00 to 51.00
Malleable	67.00 to 68.00
No. 1 machinery cast.	54.00 to 55.00

Cincinnati

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	38.00 to 39.00
No. 2 bundles	28.00 to 29.00
Machine shop turn.	21.00 to 22.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	23.00 to 24.00
Low phos. 18 in. and under	49.00 to 50.00
Rails, random length	56.00 to 57.00
Rails, 18 in. and under	64.00 to 65.00
No. 1 cupola cast.	49.00 to 50.00
Hvy. breakable cast.	44.00 to 45.00
Drop broken cast.	59.00 to 60.00

Youngstown

No. 1 hvy. melting	$47.00 to $48.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 dealer bundles	47.00 to 48.00
No. 2 bundles	31.50 to 32.50
Machine shop turn.	21.50 to 22.50
Shoveling turnings	26.50 to 27.50
Low phos. plate	51.00 to 52.00

Cleveland

No. 1 hvy. melting	$43.50 to $44.50
No. 2 hvy. melting	35.50 to 36.50
No. 1 dealer bundles	43.50 to 44.50
No. 1 factory bundles	49.00 to 50.00
No. 2 bundles	28.00 to 29.00
No. 1 busheling	46.50 to 47.50
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	24.00 to 25.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	24.00 to 25.00
Cut structural & plates, 2 ft & under	50.00 to 51.00
Drop forge flashings	43.50 to 44.50
Low phos. punch'gs plate	46.50 to 47.50
Foundry steel, 2 ft & under	45.00 to 46.00
No. 1 RR hvy. melting	47.50 to 48.50
Rails 2 ft and under	65.00 to 66.00
Rails 18 in. and under	66.00 to 67.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	60.00 to 61.00
No. 1 machinery cast.	56.00 to 57.00
Stove plate	51.00 to 52.00
Malleable	67.00 to 68.00
Stainless	
18-8 bundles	225.00 to 235.00
18-8 turnings	115.00 to 120.00
430 bundles	120.00 to 125.00

Buffalo

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 busheling	39.00 to 40.00
No. 1 dealer bundles	39.00 to 40.00
No. 2 bundles	28.00 to 29.00
Machine shop turn.	20.00 to 21.00
Mixed bor. and turn.	21.00 to 22.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	21.00 to 22.00
Low phos. plate	44.00 to 45.00
Structurals and plate, 2 ft and under	45.00 to 46.00
Scrap rails, random lgth.	43.00 to 44.00
Rails 2 ft and under	53.00 to 54.00
No. 1 machinery cast.	53.00 to 54.00
No. 1 cupola cast.	49.00 to 50.00

St. Louis

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	46.50 to 47.50
No. 2 bundles	27.00 to 28.00
Machine shop turn.	22.50 to 23.50
Shoveling turnings	24.50 to 25.50
Cast iron borings	25.00 to 26.00
No. 1 RR hvy. melting	47.00 to 48.00
Rails, random lengths	54.00 to 55.00
Rails, 18 in. and under	59.00 to 60.00
Angles and splice bars	50.00 to 51.00
RR specialties	51.50 to 52.50
Cupola cast	54.00 to 55.00
Heavy breakable cast.	45.00 to 46.00
Stove plate	45.00 to 46.00
Cast iron car wheels	48.50 to 49.50
Rerolling rails	65.00 to 66.00
Unstripped motor blocks	45.00 to 46.00

Birmingham

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	42.00 to 43.00
Machine shop turn.	25.00 to 26.00
Shoveling turnings	28.00 to 29.00
Cast iron borings	14.00 to 15.00
Electric furnace bundles	42.00 to 43.00
Elec. furnace, 3 ft & under	40.00 to 41.00
Bar crops and plate	47.00 to 48.00
Structural and plate, 2 ft.	46.00 to 47.00
No. 1 RR hvy. melting	42.00 to 43.00
Scrap rails, random lgth.	53.00 to 54.00
Rails, 18 in. and under	56.00 to 57.00
Angles and splice bars	49.00 to 50.00
Rerolling rails	61.00 to 62.00
No. 1 cupola cast.	55.00 to 56.00
Stove plate	55.00 to 60.00
Cast iron car wheels	45.00 to 46.00
Unstripped motor blocks	42.00 to 43.00

New York

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	35.00 to 36.00
No. 2 dealer bundles	24.00 to 25.00
Machine shop turnings	11.00 to 12.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	16.00 to 17.00
Clean cast, chem. borings	25.00 to 26.00
No. 1 machinery cast.	41.00 to 42.00
Mixed yard cast.	39.00 to 40.00
Heavy breakable cast.	39.00 to 40.00
Stainless	
18-8 prepared solids	200.00 to 205.00
18-8 turnings	85.00 to 90.00
430 prepared solids	85.00 to 90.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	$42.00 to $43.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	44.00 to 45.00
No. 2 bundles	23.00 to 24.00
No. 1 busheling	42.00 to 43.00
Drop forge flashings	42.00 to 43.00
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	22.00 to 23.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	23.00 to 24.00
Heavy breakable cast.	41.00 to 42.00
Mixed cupola cast.	49.00 to 50.00
Automotive cast.	55.00 to 56.00
Stainless	
18-8 bundles and solids	205.00 to 210.00
18-8 turnings	80.00 to 85.00
430 bundles and solids	100.00 to 105.00

Boston

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	37.00 to 38.00
Machine shop turn.	13.00 to 14.00
Shoveling turnings	15.00 to 16.00
Clean cast, chem. borings	18.50 to 19.50
No. 1 machinery cast.	41.00 to 42.00
Mixed cupola cast.	39.00 to 40.00
Heavy breakable cast.	35.00 to 36.00

San Francisco

No. 1 hvy. melting	$40.00
No. 2 hvy. melting	36.00
No. 1 dealer bundles	36.00
No. 2 bundles	22.00
Machine shop turn.	$17.00 to 19.00
Cast iron borings	17.00 to 19.00
No. 1 cupola cast.	47.00

Los Angeles

No. 1 hvy. melting	$41.00
No. 2 hvy. melting	39.00
No. 1 dealer bundles	38.00
No. 2 bundles	21.00
Machine shop turn.	$18.00 to 19.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Elec. furn. 1 ft and under (foundry)	49.00 to 50.00
No. 1 cupola cast.	47.00 to 48.00

Seattle

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	22.00
No. 1 cupola cast.	36.00
Mixed yard cast.	36.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	$32.25
No. 2 hvy. melting	28.25
No. 1 dealer bundles	32.25
No. 2 bundles	24.00
Mixed steel scrap	24.25
Bush., new fact., prep'd.	32.25
Bush., new fact., unprep'd	26.25
Machine shop turn.	14.00
Short steel turn.	17.00
Mixed bor. and turn.	13.00
Rails, rerolling	37.00
Cast scrap	$46.50 to 48.00

Houston

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	$34.00
No. 2 hvy. melting	31.00
No. 2 bundles	20.00
Machine shop turn.	16.00
Shoveling turnings	20.00
Cut structural plate 2 ft & under	$48.00 to 49.00
Unstripped motor blocks	39.50 to 40.50
Cupola cast.	46.00 to 47.00
Heavy breakable cast.	34.00 to 35.00

What to Expect In Copper Strikes

Just about all of the strikes are moving toward settlement.

But the issues, and the motivations, differ, so the settlements are likely to differ.

▪ The strikes in the copper industry are now moving toward settlements.

But no two situations are exactly alike. Pressures and motivating forces differ widely from company to company, union to union. Even the pace of any given negotiation varies. And throughout the industry, there are many individual negotiations.

The Picture—It all adds up to: No quick settlements are in sight, but it's imprudent to discount the possibility.

There's likely to be no "pace-setting" settlement as such. Wage and fringe hikes, and right to manage changes are likely to differ.

The first major settlement won't necessarily create immediate peace in all the copper industry.

Copper USW — For example, early this week Kennecott Copper Co. and the United Steelworkers met for full scale economic discussions at Salt Lake City, the first time since October 5.

The Steelworker position was influenced by president David J. McDonald's "massive encirclement" strategy. Mr. McDonald would like very much to surround steel with settlements in copper, aluminum and canmaking industries before the steel Taft-Hartley injunction runs out. (See P. 79)

Kennecott brought in a five-point, right to manage program. It opposes the "pay now, settle by committee later" technique used by Edgar Kaiser in steel. But it may be willing to negotiate these points: (1) Right to shutdown for vacations; (2) right to contract work out at own disgression; (3) rules of conduct, aimed at such things as absenteeism; (4) grievance procedure; and (5) make-up and size of work crews.

How Much — Hovering in the background is the original offer made by Kennecott and rejected by USW back in August—a two-year, 17.9¢ package. Late last week Phelps Dodge settled with 1800 workers in its crafts union (AFL-CIO) at its Arizona installations for a two-year, 15.7¢ package. But the Steelworkers aren't likely to settle for less than the original offer.

In Montana, Anaconda Co. is clinging to its contention it can only grant a 6.1¢ one-year package to its International Union of Mine, Mill and Smelter Workers because some of its properties have become marginal. There has been little hard bargaining here recently.

Some Yes, Some No—As with Steelworkers at Kennecott, right to manage clauses are an issue here. But Phelps Dodge reports right to manage is not an issue in talks with its Mine, Mill locals.

Talks between Kennecott and Mine, Mill have been reported "on non-economic issues." Some say the company may have been waiting the union out because it felt Mine, Mill coffers were low. They may have been right.

Usually reliable sources say Steelworkers contributed $21,000 recently to the Mine, Mill strike fund. If true, this would certainly qualify as a case of "strange bedfellows." USW has been trying to organize the copper industry out from under Mine, Mill for years.

Latest in Copper Talks

There was an official blackout on news from the sessions between Steelworkers and Kennecott Copper Co. on Monday of this week. An unofficial source in Salt Lake City suggested the company may have offered more than 17.9¢ for two years, but held fast on its right to manage program. More meetings are likely this week.

Kennecott is also scheduled to meet with Mine, Mill this week.

Meet at Butte—Anaconda Co. and Mine, Mill will sit down with the Federal Mediation and Conciliation Service on Thursday of this week in Butte, Mont.

Tin prices for the week: Nov. 11—holiday; Nov. 12—101.50; Nov. 13—101.25; Nov. 16—101.125; Nov. 17—-101.00.*

* Estimate.

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	24.70	24.00	8/1/58
Aluminum ingot	26.80	26.10	8/1/58
Copper (E)	30-33	30-31.50	11/6/59
Copper (CS)	33.00	30.00	8/1/59
Copper (L)	33.00	31.50	11/6/59
Lead, St. L.	12.80	11.80	8/24/59
Lead, N. Y.	13.00	12.00	8/24/59
Magnesium ingot	36.00	34.50	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	74.00	64.50	12/6/58
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	12.50	12.5-13	11/2/59
Zinc, N. Y.	13.00	13-13.5	11/2/59

ALUMINUM: 99% Ingot COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; Other primary prices, pg. 176.

Inland "job-tailored"
Cold Rolled Sheets work better

product: VACUUM CLEANER TANK PART

problem:

produce a handsome vacuum cleaner tank of the upright type, designed in a silhouette for consumer eye appeal. The operation to be a single deep draw. Because of the depth of the draw and the severe shaping, a sizeable amount of breakage could result. The required draw also produced stretcher strains in the shaped tank which handicapped later finishing operations.

solution:

quality standards were met and the problem overcome by "job-tailored" Inland Cold Rolled, Drawing Quality, Aluminum Killed Steel. This steel, specifically recommended for the job, successfully took the deep draw and pattern formation required. Stretcher strains were eliminated and an excellent surface obtained for all subsequent finishing.

INLAND STEEL

30 West Monroe Street, Chicago 3, Illinois

Sales Offices: Chicago • Davenport • Detroit • Houston • Indianapolis
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INLAND

Cold Rolled Sheets

NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.032	.081	.136 .249	.250-3.
1100, 3003	45.7	43.8	42.8	43.3
5052	53.1	48.4	46.9	46.0
6061-0	50.1	45.7	43.9	44.9

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6- 8	42.7-44.2	51.1-54.8
12-14	42.7-44.2	52.0-56.5
24-26	43.2-44.7	62.8-67.5
36-38	46.7-49.2	86.9-90.5

Screw Machine Stock—2011-T-3

Size*	¼	⅝-⅜	½-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	95.7	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	57.13	.....	54.86	58.32
Brass, Yellow	50.57	50.86	50.26	54.23
Brass, Low	53.53	53.82	53.22	57.09
Brass, R L	54.58	54.87	54.27	58.14
Brass, Naval	55.12	.....	48.68	58.78
Muntz Metal	53.20	.....	48.26	.....
Comm. Bz.	56.17	56.46	55.86	59.48
Mang. Bz.	58.86	.....	52.21	.....
Phos. Bz. 5%	77.44	.....	78.19	.....

Free Cutting Brass Rod 36.06

TITANIUM

(Base prices f.o.b. mill)

Sheet and strip, commercially pure, $7.25-$8.50; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$6.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.75-$6.25; alloy, $7.75-$10.00; Bar, HR or forged, commercially pure, $4.25-$5.00; alloy, $4.25-$7.50; billets, HR, commercially pure, $3.55-$4.10; alloy, $3.55-$5.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.40
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base.... $ 1.31
Cobalt, 97-99% (per lb).... $1.75 to $1.82
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 33.30 to 42.00
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9%, dollars per troy oz.. $ 2.25
Iridium, dollars per troy oz.... $75 to $85
Lithium, 98% ..... $11.00 to $14.00
Magnesium sticks, 100 to 500 lb.... 59.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $218 to $220
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz... $20 to $22
Platinum, dollars per troy oz... $77 to $80
Rhodium ..... $120.00 to $125.00
Silver ingots (¢ per troy oz.)..... 91.375
Thorium, per kg. $43.00
Vanadium ..... $ 3.45
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 30.75
No. 120 ..... 29.25
No. 123 ..... 28.75
80-10-10 ingot
No. 305 ..... 35.25
No. 315 ..... 33.00
88-10-2 ingot
No. 210 ..... 44.00
No. 215 ..... 40.75
No. 245 ..... 36.00
Yellow ingot
No. 405 ..... 24.75
Manganese bronze
No. 421 ..... 29.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 25.00-25.25
0.60 copper max. 24.75-25.00
Piston alloys (No. 132 type)..26.75-27.75
No. 12 alum. (No. 2 grade)...23.50-24.00
108 alloy 24.00-24.50
195 alloy 26.50-27.50
13 alloy (0.60 copper max.)...24.75-25.00
▲XS-679 (1 pct zinc) 23.75-24.75

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½% 24.00-25.00
Grade 2—92-95% 22.75-23.75
Grade 3—90-92% 21.75-22.75
Grade 4—85-90% 21.25-22.25

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	29	28¼
Yellow brass	22¼	20¼
Red brass	25¾	25
Comm. bronze	26¼	26
Mang. bronze	20¾	20
Free cutting rod ends.	21¼	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 29½
No. 2 copper wire 26¼
Light copper 24
*Refinery brass 24½
Copper bearing material 23½
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 30
No. 2 copper wire 26
Light copper 24
No. 1 composition 23¼
No. 1 comp. turnings 22¾
Hvy. yellow brass solids 17
Brass pipe 16½
Radiators 18¼

Aluminum

Mixed old cast. ..... 14 —15
Mixed new clips ..... 16½—17
Mixed turnings, dry ..... 14½—15½

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 26½—27
No. 2 copper wire ..... 24 —24½
Light copper ..... 22 —22½
Auto radiators (unsweated). 15 —15½
No. 1 composition ..... 19½—20
No. 1 composition turnings.. 18 —18½
Cocks and faucets ..... 15¼—15¾
Clean heavy yellow brass ... 13½—14
Brass pipe ..... 15¼—15¾
New soft brass clippings .... 15½—16
No. 1 brass rod turnings .... 12¾—13¼

Aluminum

Alum. pistons and struts .... 7½— 8
Aluminum crankcase ..... 11¼—11¾
1100 (2s) aluminum clippings 15 —15½
Old sheet and utensils ..... 11¼—11¾
Borings and turnings ..... 7 — 7½
Industrial castings ..... 11¼—11¾
2020 (24S) clippings ..... 12½—13

Zinc

New zinc clippings ..... 6¼— 6¾
Old zinc ..... 4¼— 4¾
Zinc routings ..... 3 — 3¼
Old die cast scrap ..... 2½— 2¾

Nickel and Monel

Pure nickel clippings 52-54
Clean nickel turnings 40
Nickel anodes 52-54
Nickel rod ends 52-54
New Monel clippings 30-32
Clean Monel turnings 20-23
Old sheet Monel 26-28
Nickel silver clippings, mixed 18
Nickel silver turnings, mixed 15

Lead

Soft scrap lead ..... 8¾— 9¼
Battery plates (dry) ..... 4¼— 4½
Batteries, acid free ..... 2½— 2¾

Miscellaneous

Block tin ..... 77 —78
No. 1 pewter ..... 59 —60
Auto babbitt ..... 40 —41
Mixed common babbitt ..... 9¾—10¼
Solder joints ..... 14 —14½
Siphon tops ..... 4¢
Small foundry type ..... 10¼—10¾
Monotype ..... 10¼—10¾
Lino. and stereotype ..... 9¼— 9¾
Electrotype ..... 7¾— 8¼
Hand picked type shells .... 6 — 6½
Lino. and stereo. dross ..... 2¾— 3¼
Electro dross ..... 2¾— 3¼

(Effective Nov. 16, 1959)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3, R3*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Bridgeport, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3,* $114.00 *T5*						7.425 *G4*		10.00 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8*	7.575 *W8*		8.40 *W8, S9,13*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.00 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1;* *C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.00 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.00 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

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STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25 lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*			7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

*Electrogalvanized sheets.

(Effective Nov. 16, 1959)

**7.425 at Sharon-Niles is 7.225

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr'a. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.675 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7, A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3* 6.475 *T5*	9.025 *R3,R2* 8.775 *T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5* 9.225 *B5,P3, P8*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, S12*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*				9.05 *B2*	6.20 *b2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.675 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Nov. 16, 1959) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B. Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E4 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Chicago, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $280 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	†15.0	3.25	†11.0	6.75	†6.50	9.25	†5.75	9.75	†4.75	10.25	†4.25	11.75	†4.50								
Youngstown *R3*	2.25	†13.0	5.25	†9.0	8.75	†4.50	11.25	†3.75	11.75	†2.75	12.25	†2.25	13.75	†2.50								
Fontana *K1*	†10.75	†26.00	†7.75	†22.00	†4.25	†17.50	†1.75	†16.75	†1.25	†15.75	†0.75	†15.25	0.75	†15.50								
Pittsburgh *J3*	2.25	†13.0	5.25	†9.0	8.75	†4.50	11.25	†3.75	11.75	†2.75	12.25	†2.25	13.75	†2.50	†12.25	†27.25	†5.75	†22.50	†3.25	†20.0	†1.75	†18.50
Alton, Ill. *L1*	0.25	†15.0	3.25	†11.0	6.75	†6.50	9.25	†5.75	9.75	†4.75	10.25	†4.25	11.75	†4.50								
Sharon *M3*	2.25	†13.0	5.25	†9.0	8.75	†4.50	11.25	†3.75	11.75	†2.75	12.25	†2.25	13.75	†2.50								
Fairless *N2*	0.25	†15.0	3.25	†11.0	6.75	†6.50	9.25	†5.75	9.75	†4.75	10.25	†4.25	11.75	†4.50								
Pittsburgh *N1*	2.25	†13.0	5.25	†9.0	8.75	†4.50	11.25	†3.75	11.75	†2.75	12.25	†2.25	13.75	†2.50	†12.25	†27.25	†5.75	†22.50	†3.25	†20.0	†1.75	†18.50
Wheeling *W5*	2.25	†13.0	5.25	†9.0	8.75	†4.50	11.25	†3.75	11.75	†2.75	12.25	†2.25	13.75	†2.50								
Wheatland *W4*	2.25	†13.0	5.25	†9.0	8.75	†4.50	11.25	†3.75	11.75	†2.75	12.25	†2.25	13.75	†2.50								
Youngstown *Y1*	2.25	†13.0	5.25	†9.0	8.75	†4.50	11.25	†3.75	11.75	†2.75	12.25	†2.25	13.75	†2.50	†12.25	†27.25	†5.75	†22.50	†3.25	†20.0	†1.75	†18.50
Indiana Harbor *Y1*	1.25	†14.0	4.25	†10.0	7.75	†5.50	10.25	†4.75	10.75	†3.75	11.25	†3.25	12.75	†3.50								
Lorain *N2*	2.25	†13.0	5.25	†9.0	8.75	†4.50	11.25	†3.75	11.75	†2.75	12.25	†2.25	13.75	†2.50	†12.25	†27.25	†5.75	†22.50	†3.25	†20.0	†1.75	†18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	†9.0	8.75	†5.0	11.75	†0.50	12.25	†1.75	12.75	†0.75	13.25	†0.25	13.75	†1.50								
Youngstown *R3*	6.75	†7.0	10.75	†3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	†9.0	8.75	†5.0	11.75	†0.50	12.25	†1.75	12.75	†0.75	13.25	†0.25	13.75	†1.50								
Fontana *K1*	†6.25		†2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	†7.0	10.75	†3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	†10.75	†24.75	†3.25	†19.0	†0.75	†16.50	4.25	†11.50
Alton, Ill. *L1*	4.75	†9.0	8.75	†5.0	11.75	†0.50	12.25	†1.75	12.75	†0.75	13.25	†0.25	13.75	†1.50								
Sharon *M3*	6.75	†7.0	10.75	†3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	†7.0	10.75	†3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	†10.75	†24.75	†3.25	†19.0	†0.75	†16.50	4.25	†11.50
Wheeling *W5*	6.75	†7.0	10.75	†3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	†7.0	10.75	†3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	†7.0	10.75	†3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	†10.75	†24.75	†3.25	†19.0	†0.75	†16.50	4.25	†11.50
Indiana Harbor *Y1*	5.75	†8.0	9.75	†4.0	12.75	0.50	13.25	†0.75	13.75	0.25	14.25	0.75	14.75	†0.50								
Lorain *N2*	6.75	†7.0	10.75	†3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	†10.75	†24.75	†3.25	†19.0	†0.75	†16.50	4.25	†11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 12.50¢ per lb.

(Effective Nov. 16, 1959)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

Stainless Type	Cladding	Plate (*L4, C4, A3, J2*) 10 pct	Plate (*L4, C4, A3, J2*) 15 pct	Plate (*L4, C4, A3, J2*) 20 pct	Sheet (*I2*) 20 pct
302		.....	.....	.....	37.50
304		28.80	31.55	34.30	40.00
316		42.20	46.25	50.25	58.75
321		34.50	37.75	41.05	47.25
347		40.80	44.65	48.55	57.00
405		24.60	26.90	29.25	.....
410		22.70	24.85	27.00	.....
430		23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 42.50; 1 side, 35.85.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	15.35
So. Chicago *R3*	.....	.....	.....	10.10	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Huntington, *C16*	.....	6.725	.....	.....	.....	.....
Ind. Harbor *I1*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*	.....	.....	.....	.....	.....	15.35
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	6.75	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

COKE

	Net-Ton
Furnace, beehive (f.o.b.) Connellsville, Pa.	$14.50 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Detroit f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearney, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	34.35
Erie, Pa., f.o.b.	32.00
Cleveland, del'd	34.19
Cincinnati, del'd	32.84
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1959 season. Freight charges for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor		12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30		
		Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	GRAPHITE Length (In.)	GRAPHITE Price	CARBON* Diam. (In.)	CARBON* Length (In.)	CARBON* Price
24	84	27.25	40	100,110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky.	$185.00
High duty (except Salina, Pa., add $5.00)	140.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$158.00
Childs, Hays, Latrobe, Pa.	163.00
Chicago District	168.00
Western Utah	183.00
California	165.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	163.00-168.00
Silica cement, net ton, bulk, Latrobe	29.75
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$109.00
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Balt.	103.00

Magnesite Brick

Standard, Baltimore	$140.00
Chemically bonded, Baltimore	119.00

Grain Magnesite

St. ⅝ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$16.75
Missouri Valley	15.60
Midwest	17.00

(Effective Nov. 16, 1959)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3***	173	190	...	...	190	9.00	9.675
Atlanta *A8***	175	192	...	214	198	8.75	9.425
Bartonville *K2***	175	192	178	214	198	9.10	9.775
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4***	177	190	172	212	196	9.00	9.70
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dsv. *M4***	175	192	...	214	198	9.10	9.775
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	...	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	17.	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9*	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Monessen *P6*	.....	.....	.....	.....	193	8.65	9.325
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.60	10.15
Rankin, Pa. *A5*	173	187	...	...	193	9.00	9.55
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50†
SparrowsPt. *B3***	175	.....	.....	214	198	9.10	9.75
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.30
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 11-12¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Chicago	.....	.....	.....	15.60	.....
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	.....	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

METAL POWDERS

Cents per lb, minimum truckload, delivered E. of Miss. River, unless otherwise noted.

Iron Powders

Compacting Powders

Electrolytic, imported, f.o.b.	29.50 to 33.00
Electrolytic, domestic	34.50
Sponge	11.50
Atomized	11.25
Hydrogen Reduced	11.25 to 12.00
Carbonyl	88.00
Welding Powders*	8.10
Cutting and Scarfing Powders*	9.10

Copper Powders

Electrolytic, domestic	48.25
Precipitated	40.50 to 45.00
Atomized	39.80 to 48.30
Hydrogen reduced, f.o.b.	43.25
Bronze	47.20 to 51.50
Chromium, electrolytic	$5.00
Lead	19.00
Manganese, f.o.b.	42.00
Molybdenum	$3.60 to $3.95
Nickel	$1.05 to $1.03
Nickel Silver	53.50
Nickel Steel	13.00
Solder	13¢ plus metal value
Stainless Steel, 302	$1.07
Stainless Steel, 316	$1.26
Steel, atomized, prealloyed, 4600 series	14.00 plus metal value
Tin	14¢ plus metal value
Titanium, 99.25+%, per lb., f.o.b.	$11.25
Tungsten	$3.15 (nominal)

* F.O.B., shipping point.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct. Discounts

Bolts	1-4 Containers	5 Containers	20,000 Lb.	40,000 Lb.
Machine				
½" and smaller x 3" and shorter	55	57	61	62
5/8" diam. x 3" and shorter	47	49½	54	55
¾" thru 1" diam x 6" and shorter	37	39½	45	46
¾" thru 1" diam. longer than 6" and 1½" and larger x all lengths	31	34	40	41
Rolled thread, ½" and smaller x 3" and shorter	55	57	61	62
Carriage, lag, plow, tap, blank, step, elevator and fitting up bolts ½" and smaller x 6" and shorter	48	50½	55	56

Note: Add 25 pct for less than container quantity. Distributor prices are 5 pct less on bolts and square nuts.

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½
C. P. Hex, reg. & hvy.	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½
Hot Galv. Hex Nuts (All Types)	
¾ in. and smaller	41
Semi-finished Hex Nuts	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

(Add 25 pct for broken case or keg quantities)

Finished

⅞ in. and smaller 65

Rivets	*Base per 100 lb*
½ in. and larger	$12.85
	Pct. Off List
7/16 in. and smaller	15

Cap Screws	*Discount (Packages)*
	Full Finished H. C. Heat Treat
New std. hex head, packaged	Full Case
⅝" diam. and smaller x 6" and shorter	54
⅞", ⅞", and 1" diam. x 6" and shorter	38
⅝" diam. and smaller x longer than 6"	..
⅞", ⅞", and 1" diam. x longer than 6"	..

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	59	48
¾" through 1" dia. x 6" and shorter	45	32

Minimum quantity—¼" through ⅜" diam., 15,000 pieces; 7/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

	Discount Mach. Screws	Stove Bolts
Plain Finish Cartons	60	60
Bulk		
Quantity		
To ¼" diam. incl. — 25,000-and over	60	..
5/16 to ½" diam. incl. — 15,000-200,000	60	..

Machine Screws & Stove Bolt Nuts

	Discount Hex	Square
In Cartons	16	19
Quantity		
In Bulk ⅜" diam. & smaller — 25,000-and over	15	16

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	46.00
Electrodeposited	38.50
Brass, 80-20, ball anodes, 2000 lb or more	51.50
Zinc, ball anodes, 2000 lb lots	18.75
(for elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carton, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium, 5000 lb	1.30
Tin, ball anodes $1.05 per lb (approx.).	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	65.90
Copper sulphate, 100 lb bags, per cwt.	22.75
Nickel salts, single, 100 lb bags	36.00
Nickel chloride, freight allowed, 100 lb	45.00
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	24.70
(Philadelphia price 25.00)	
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	45.50
Chromic acid, flake type, 10,000 lb or more	30.44

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	140.9
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

STEEL SERVICE CENTERS

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.91	9.29	9.40	9.39	13.24	.....	.....	.....	.....
Baltimore**	$.10	9.90	10.10	10.09	11.55	10.00	10.65	10.15	11.90	17.48	16.48	21.58	20.83
Birmingham**		9.43	10.20	10.46	10.91	9.79	10.00	9.59	13.14	16.76	.....	.....	.....
Boston**	.10	10.52	11.27	11.82	12.17	10.42	10.72	10.34	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	9.80	10.50	11.35	11.30	10.25	10.40	9.90	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.69	10.35	11.10	10.35	8.62	9.16	8.79	10.80	17.10	16.10	19.70	20.45
Cincinnati**	.15	8.86	10.41	11.10	10.67	9.00	9.84	9.11	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.69[1]	9.89	11.02	10.47	8.88	9.67	8.90	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19	.....	.....	.....	20 84
Detroit**	.15	8.95	10.61	11.40	10.72	8.99	9.84	9.10	11.16	17.38	16.38	21.48	21.03
Houston**		9.65	9.65	.....	10.85	9.65	9.35	8.90	13.10	17.50	16.55	21.55	20.85
Kansas City	.15	9.02	10.27	11.37	9.33	9.71	9.82	9.81	10.22	16.87	15.87	20.37	19.62
Los Angeles**		9.95[1]	11.55	12.20	11.55	10.00	10.00	9.10	14.20	18.30	16.45	21.30	20.80
Memphis	.15	8.55	9.80	.....	8.60	8.93	9.01	8.97	12.11	.....	.....	.....	.....
Milwaukee**	.15	8.83	10.49	11.24	10.49	8.76	9.30	8.93	11.04	17.24	15.34	21.24	19.09
New York	.10	9.27	10.59	11.40	9.74	9.87	9.84	10.09	13.35	16.16	15.60	20.10	19.35
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	8.30	9.35	10.71	9.35	9.25	9.20	9.50	12.05	16.58	15.58	20.08	19.33
Pittsburgh**	.15	8.69	9.84	10.91	10.45	8.62	9.78	8.79	11.40	17.10	16.10	19.70	20.45
Portland		10.00	11.75	13.30	11.95	11.50	11.10	9.85	15.30	18.50	17.45	20.75	20.25
San Francisco**	.10	11.00	11.95[2]	11.50	12.25	11.00	10.95	10.75	15.20	18.30	16.35	22.90	20.60
Seattle**		11.55	12.30	12.50	12.65	11.00	10.20	11.10	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	11.70	12.45	12.65	13.30	11.15	11.35	11.75	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	9.07	10.73	11.48	10.73	9.00	9.76	9.17	11.43	17.48	16.48	21.58	19.33
St. Paul**	.15	8.95	9.46	10.62	10.47	8.75	9.48	8.85	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—¾" x 12"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅝-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—¾" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 10¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter.

(Effective Nov. 16, 1959)

STEELMASTER

SHEARS
BILLETT AND BAR

◆ ● —

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INCLUDING FULLY AUTOMATICS

from $2,030, F.O.B. Buffalo

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Phone MAdison 7033. Telegraph PATEXCO, Buffalo

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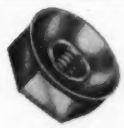
— Up to 6"



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FINISHED NUTS
Heavy • Regular Jam

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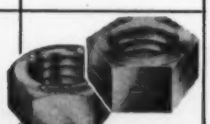
Single & Double Chamfer

STOP-NUTS WITH FIBER INSERT

WING NUTS

MACHINE-SCREW NUTS
Standard & Small Pattern — Single & Double Chamfer

CAP NUTS



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Standard & Reversible One-Piece — Re-usable

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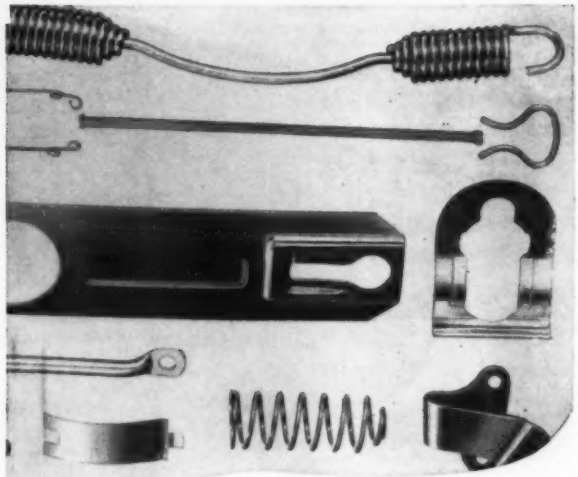
JACOBSON NUT MFG. CORP. Kenilworth, New Jersey



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CLEVELAND 5, OHIO

(Ferroalloy prices will next appear in the Nov. 26 issue.)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	.....
Birmingham *R3*	62.00	62.50*		.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	.....
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	.....
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4* (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $103.50; (15.51-16.00), $106.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.25 for each 0.50 pct manganese over 1.00 pct. Basemer silvery pig iron (under .10 pct phos.): $64.00. Add $1.00 premium for all grades silvery to 18 pct.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25 31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; Vandergrift, Pa., *U1*; Washington, Pa., *W2*, *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Detroit, *M2*; Louisville, O., *R5*.

Strip: Midland, Pa., *C11*; Waukegan, Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville Pa., *U2*; Detroit, *M2*; Detroit. *S1*; Canton, Massillon, O., *R3*; Harrison, N. J., *D3*; Youngstown. *R5*; Sharon, Pa., *S1*; Butler, Pa., *A7* Wallingford. Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13*, (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1*, (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7*; S. Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R5*; S. Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*, *R3*; Ft. Wayne, *I4*; Detroit, *R5*; Gary, *U1*; Owensboro, Ky., *G5*; Bridgeport, Conn., *N8*; Ambridge, Pa., *B7*.

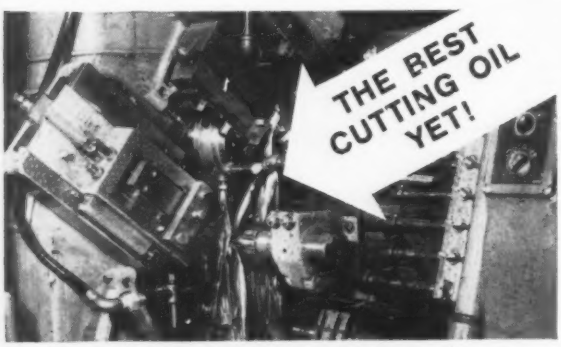
Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Newark, N. J. *D2*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*; Detroit, *R5*; Reading, Pa., *C2*; Bridgeport, Conn., *N8*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*; S. Chicago, *U1*.

Plates: Ambridge. Pa., *B7*; Baltimore, *E1*; Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Vandergrift, Pa., *U1*; Gary, *U1*.

Forging billets: Ambridge, Pa., *B7*; Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R5*; Munhall, Pa., S. Chicago, *U1*; Owensboro, Ky., *G5*; Bridgeport, Conn., *N8*; Reading, Pa., *C2*.

(Effective Nov. 16, 1959)



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A base cutting oil for use in working both ferrous and non-ferrous metals. Can be used straight or reduced with mineral oil to suit the metal and work. Non-corrosive. Permits visibility when mixed. Has exceptional anti-weld properties, lubricity and film strength. For b tter finish of product and longer tool and die life, use "DARL".

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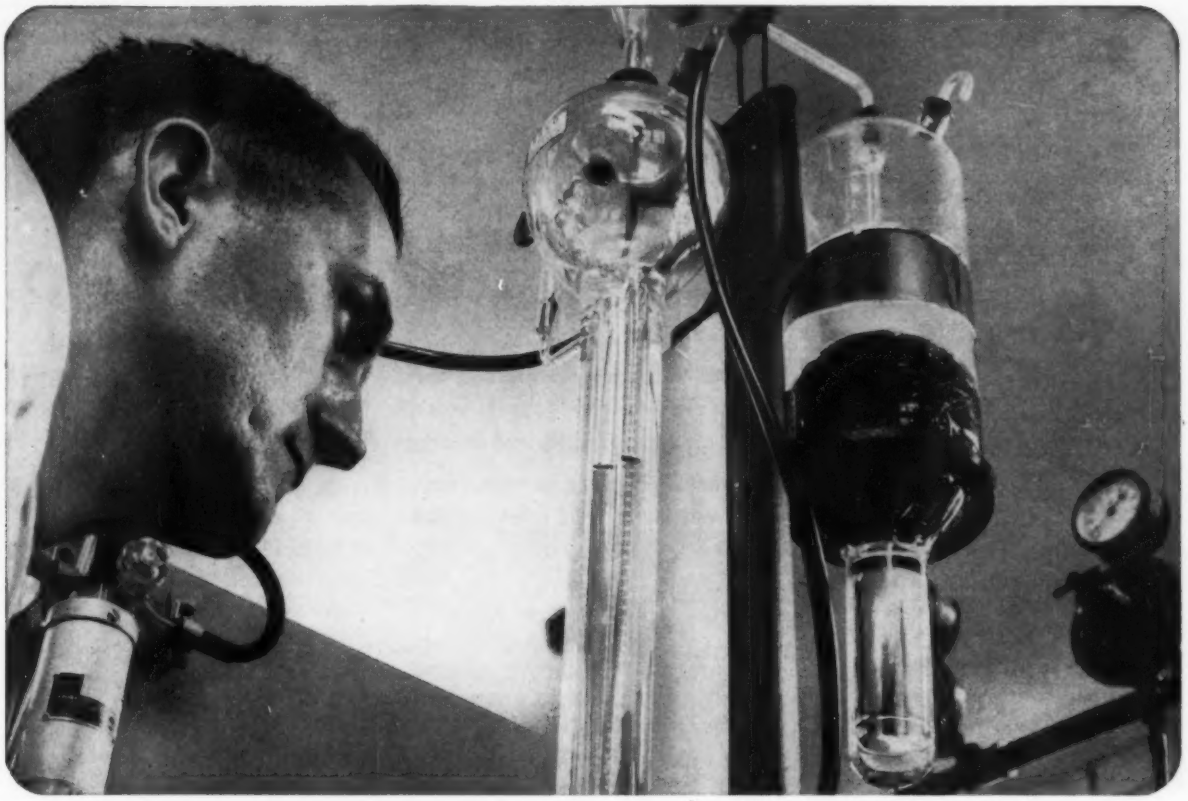

QUICK, FAST TESTING for carbon content is done not once or twice but 8 times per melt in A-L's Chem Lab with this direct reading Leco carbon determinator.

Carbon content checked 8 times during melt to guarantee A-L tool steel hardenability

Lab tests for carbon eliminate your guesswork; provide high hardness, uniform hardenability, reproducible tool performance.

Because carbon has the greatest influence on hardenability, Allegheny Ludlum watches it carefully during the melt. Testing a specimen for carbon takes only a few minutes. Therefore, A-L checks for carbon content 8 times during the melt, and makes the necessary adjustments to insure accurate control of carbon. This control means Allegheny Ludlum can hold carbon content to a closer range than most customers specify.

Carbon control at Allegheny Ludlum assures you of precise response to heat treating. This control in the melt brings you predictable, *high hardness, uniform hardenability* and *reproducible tool performance.*

This is just one of the many things A-L does to insure high quality. Here are some others: close control over forging techniques, rigid temperature-time programming, careful testing of billets prior to processing to insure good surface and sound interior, control over annealing to give you the right hardness for your exact machining operation, thorough metallurgical testing to insure top tool steel quality and meeting of your specifications.

Allegheny Ludlum stocks a complete line of tool steel sizes and grades. Call your nearest A-L representative; you'll get quick service and counsel on such problems as heat treating, machining, grade selection, etc. Or write for A-L's publication list which gives full data on the more than 125 technical publications offered. They'll make your job easier.

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WSW-7261

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Philadelphia Dealers Come Out Of Slump

Used machinery dealers in the Philadelphia area report sales have picked up in the last month.

Other areas, however, say, business is still at steel strike levels.

▪ Philadelphia used machinery dealers say business has picked up. Needless to say, they're relieved after wallowing through a very slow period during the steel strike.

However, dealers in areas around the Quaker City report business still hasn't taken any sharp change for the better.

Faster Pace—One Philadelphian says business has certainly picked up in the last 30 days. Customers are buying more. Inquiries are coming in faster. There is a wide variety in orders, he says. Just about everything is moving.

Machine tools and transformers are really selling. This dealer says he has filled orders for transformers in Florida and Chicago. To him this means plants are being expanded and that there will be even more business.

Quick Sales—He says the sales took only 48 hours to complete, faster than he is used to. A boring mill and milling machine sale also only took two days. A representative of the buyer came in one day and the next day a truck was there to pick up the purchases.

He adds that 75 pct of the inquiries are coming from other dealers all around the country. There is apparently little local business.

At Last—He sums up, people have stopped thinking about buying used machines. Now they're buying.

Another Philadelphian was less optimistic, but said business is better.

Inquiries are up he said, but not quite to where they should be. There is evidence of interest on the part of more buyers in machines of all varities.

Both, though, say they think the trend will be a good pick-up in business during the next few months.

Camden Slow—Across the Delaware River, in Camden, N. J., a dealer says there has been no real change since the Taft-Hartley injunction. Business is still slow and the inquiry rate has only risen a little. The end of the steel shutdown apparently hasn't encouraged buyers, he says. But he is optimistic and says there should be an upturn in this area soon. About the future: "We're just hoping for a good sales period."

In the Baltimore area business is still as bad as during the strike. A dealer there says buyers are afraid to make any positive move. They're looking around at supplies, but few are buying.

The consensus in Philadelphia is now that the steel mills are back in operation, business will climb. The plant expansion programs throughout the country should mean increased sales. No one feels that there will be a mad scramble for used machines, but now that users are buying again good business should hold for six months.

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10 ton P&H	39' Span	230 Volt D.C.
10 ton Milwaukee	57' Span	230 Volt D.C.
10 ton Whiting	75' Span	220/3/60 A.C.
10 ton Shaw	120' Span	230 Volt D.C.
15 ton Milwaukee	56' Span	440/3/60 A.C.
15 ton Shepard Niles	55' 6" Span	220/3/60
20 ton P&H	57' 6" Span	220/3/60
30 ton Shaw	70' Span	230 Volt D.C.
120 ton Niles	67' Span	230 Volt D.C.
120 ton Shepard Niles	77' Span	220/3/60 A.C.

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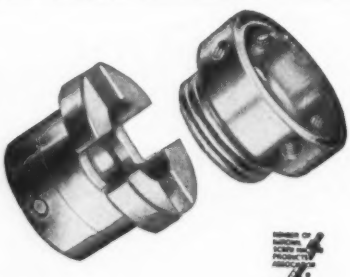

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BOX G-965
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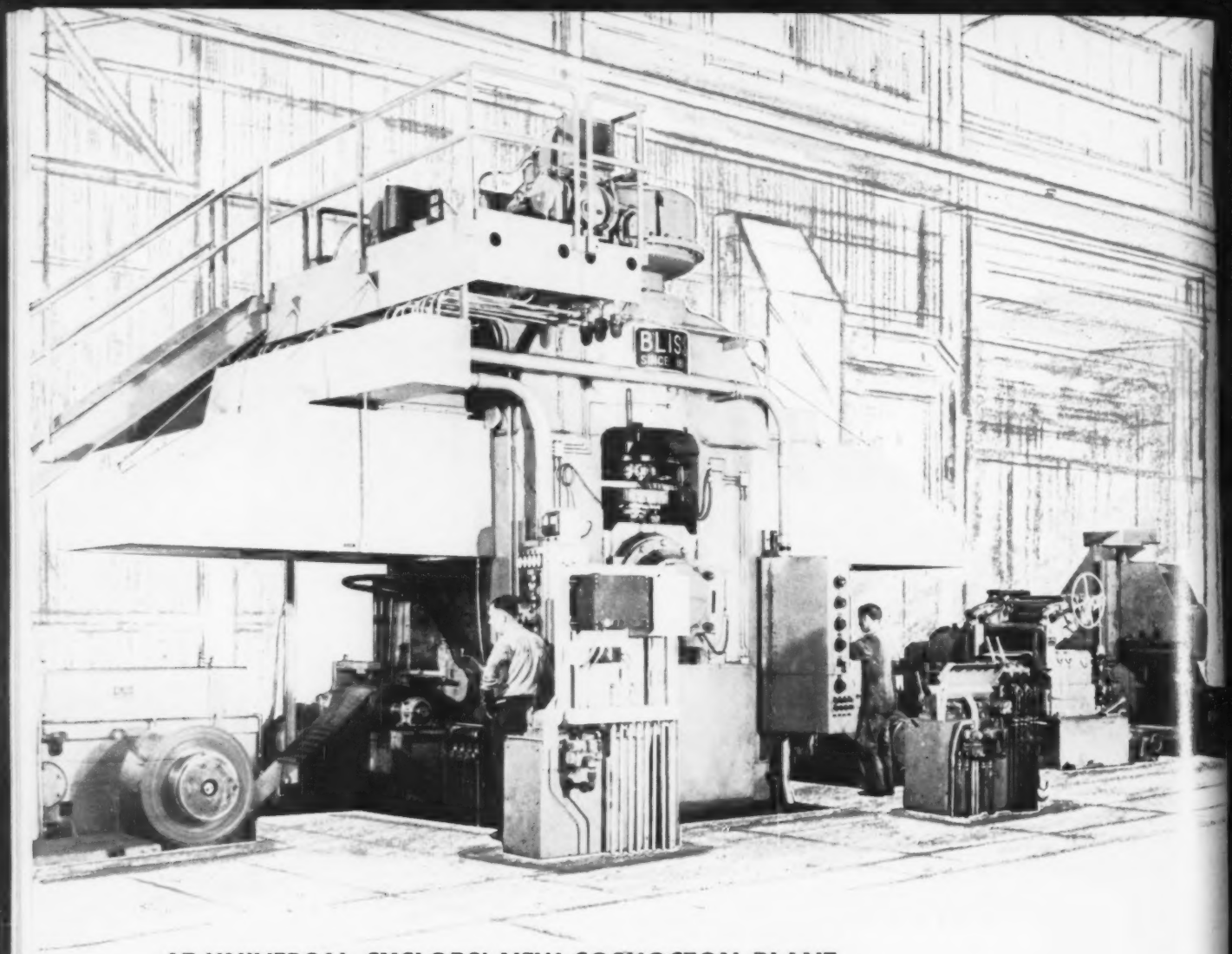

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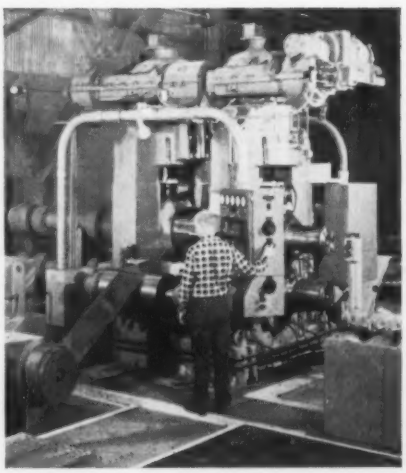

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